The Journal

OF THE

AMERICAN DENTAL ASSOCIATION

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PHYSICS AND MECHANICS INVOLVED IN SERVICEABLE PORCELAIN JACKET CROWN RESTORATIONS

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PRESERVATION or restoration of the integrity of the dental arches is of paramount importance if gross disfigurement, impaired efficiency, negative esthetic values and local and systemic disease are to be avoided. Prevention of all dental disease or disorders should be the ultimate aim of the dental profession, and every form of treatment accorded a patient should be preventive in character.

At the present time, we have not attained the ideal of complete prevention of dental disease, and even if there were means whereby the absolute prevention of dental caries or irregularities could be accomplished, there would always be a large percentage of people who would not avail themselves of the treatment any more than they now avail themselves of other established and proved preventive measures for other systemic disorders. In addition, there are the increasingly large number of accident and injury cases which require restorative measures.

With this situation in view, the profession should, while applying all the known means of preventing dental disease, focus its attention on the best possible means of restoration that will promote health, comfort, function and esthetic appearance.

A question that might well be asked is: "What individual restoration is an ideal one, or what qualities go to make up an ideal individual tooth restoration?" and "Is there such a method that can be universally used in the restoration of any or all broken down teeth in the absence of disease that warrants the retention of such a tooth in the dental arch?"

There is such a method. The degree of perfection attained is in direct proportion to the accuracy of technic, judgment and skill of the operator, during both preparation and restoration. The form and color can be so developed that the artifice can be detected only by the

Read at the Annual Midwinter Meeting of the Chicago Dental Society, February 25, 1943.

closest inspection. Functional activity can be restored and the health of the environmental tissues can be protected. Could anything more be required of any restoration?

The porcelain jacket crown, which is such a replacement medium, has the advantage of being indicated on either vital or non-vital teeth, anterior or posterior, of either arch. Crown work is rather a radical procedure when we consider the amount of tooth structure removed during preparation, but the results obtained more than justify the amount of tooth structure lost during the preparation, provided it is conservative.

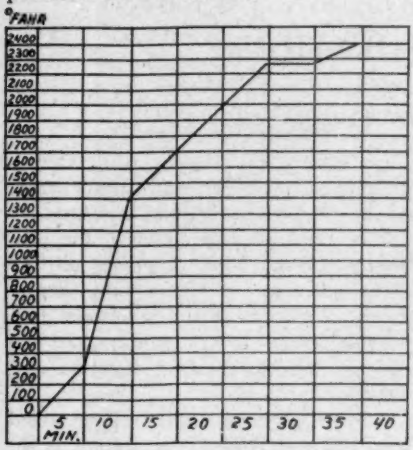

Fig. 1.—Graph showing time and temperatures employed in baking specimens.

The history of a high percentage of the teeth which, owing to caries, must be replaced by means of porcelain jacket crowns seldom varies, particularly in the anterior teeth. The beginning is usually incipient decay in the region of the contact point, which, if properly treated by means of a gold foil filling with margins extended to immune areas, would call for a small, almost unnoticeable and permanent restoration. Such treatment is preventive in the highest degree. This form of treatment is the exception, rather than the rule, at the present time. Instead, a cement filling is usually placed which, in varying lengths of time, disintegrates and washes out, being repeatedly replaced with larger and deeper fillings of the same kind until one or both incisal angles become weakened and are fractured off. Some optimistic operators even attempt restoration of the angles with the same type of filling.

Obviously, such a practice is wrong, and if such possibilities were explained to the patient, there would be no question as to the type of service which would be most acceptable. No individual wants temporary work, which must be done over at varying intervals, when one permanent and satisfactory method is available. Incidentally, all of the damage following such a procedure is not at the expense of tooth structure, for, as fillings wash out, the contact is lost, which permits packing of food particles into the interproximal space, resulting in soft tissue irritation and destruction. Then follows loss of the normal interproximal space owing to drifting of teeth mesially to take up the space occupied originally by the normally contoured tooth.

This is the history of a large number of cases requiring porcelain jacket crowns in the anterior part of the mouth, a progression of disastrous conditions prevention of which in the beginning would have made the porcelain jacket crown unnecessary, as well as relieving the patient of the added trouble and expense.

Many of the profession are under the impression that porcelain jackets are limited in their application to the six anterior teeth, because it is in this location that they are most necessary for esthetic purposes and most appreciated by the patient. In general, they are equally useful on any tooth whether vital or non-vital, in either arch, where access and the operator's skill are such that adequate preparation is possible.

In particular, they are indicated in

(1) teeth badly broken down from either accident or caries, (2) hypoplastic teeth, (3) peg-shaped lateral incisors, (4) badly discolored teeth or teeth with mottled enamel, (5) badly eroded or abraded teeth and (6) widely spaced or poorly alined anterior teeth (within reasonable limits), and (7) for increasing the vertical dimension in reconstruction cases and, (8) with certain modifications, as bridge abutments. So we see that it is practically universal in its application.

but nothing definite that could be duplicated or proved from the data supplied. Nothing of definite value was found regarding volumetric change, specific gravity, modulus of rupture, impact tests or porosity. This is one reason that porcelain has not been more generally used. Next, the successful application of porcelain jackets requires a thorough knowledge of dental anatomy and histology. In no other type of operative procedure is this more necessary. In addition, accurate preparation is an absolute neces-

TABLE 1.—RESULTS OBTAINED FROM TESTS

Specimen	Method of Condensation	Mix	Apparent Specific Gravity	Mean Specific Gravity	Volume Shrinkage	Mean Volume Shrinkage Per Cent	Linear Shrinkage	Modulus of Rupture	Mean Modulus of Rupture
C 1 A	Mechanical vibration	Wet	2.39	2.35	38.6	38.1	12.9	6,800	6,950
C 1 B	Mechanical vibration	Wet	2.31		37.6		12.5	7,100	
C 2	Poured and vibrated	Very wet	2.37	2.33	37.7	38.4	12.6	7,000	7,150
C 2 A	Poured and vibrated	Very wet	2.30		39.1		13.0	7,300	
C 3	Gravitation	Wet	2.33	2.36	39.8	40.5	13.3	4,700	5,300
C 3 A	Gravitation	Wet	2.39		41.3		13.8	5,900	
C 4	Poured, no vibration	Very wet	2.40	2.38	42.8	41.5	14.3	4,200	4,900
C 4 A	Poured, no vibration	Very wet	2.37		40.2		13.4	5,600	
C 5*	Poured, no vibration	Very wet	2.29	2.25	37.5	38.5	12.5	6,100	6,100
C 5 A*	Poured, no vibration	Very wet	2.21		39.6		13.2	6,100	
C 6*	15-minute vibration	Medium	2.20	2.27	37.1	38.2	12.4	5,700	5,050
C 6 A*	15-minute vibration	Medium	2.35		39.3		13.1	4,400	
C 7	Vibrated	Dry	2.30	2.28	34.2	34.3	11.4	6,300	7,250
C 7 A	Vibrated	Dry	2.26		34.4		11.4	8,200	
C 8	Poured, no vibration	Very wet	2.32	2.32	48.2	47.4	16.1	8,400	7,250
C 8 A	Poured, no vibration	Very wet	2.32		46.7		16.0	6,100	

*Glycol specimens.

Why, we might ask at this point, if they are so adaptable to the foregoing conditions, are they not more generally used? There are a number of reasons. First, until recently, there was little known of the physical properties of porcelain. In 1934, I began research on the physical properties of baked porcelain. In a review of the literature, virtually nothing of a scientific nature was found. There were a great many articles on porcelain technics and empiric statements regarding the physical properties,

sity if physical or mechanical failure is to be avoided.

The technic of preparation is so standardized that there is little use of repeating it. The main objectives in the preparation are the protection of the pulp, the peridental membrane and the gingival tissues and conservation of tooth structure.

Before any operative steps are taken, a careful study must be made of the position and size of the pulp, extent of caries or depth of previously placed fill-

ings, as well as the condition of the apex of the root and investing tissues, with the aid of recent roentgenograms. Many pulps that have the appearance of vitality in an x-ray film will be found to be either dead or degenerated when tested by means of electrical current or thermal change. Accurate study casts will permit a much more detailed examination of the occlusion than is possible in the mouth. All of this information is necessary for an accurate preparation and a minimum of injury to both hard and soft tissues, as well as a preparation that, owing to its form, will meet and supplement the physical limitations of the baked porcelain when subjected to the stresses and strains of mastication.

Baked porcelain, while an ideal material for restorations in the mouth because of its esthetic possibilities, the tolerance of soft tissue which contacts it when the porcelain is highly glazed and its insulation properties, has, when adequately supported, a high resistance to direct force, but low resistance to impact force or to torque. The latter weakness implies the necessity of proper occlusion in all masticating movements to prevent trauma or sudden impact.

Fig. 2.—Ideal preparation embodying shoulder cut at right angles to long axis of tooth and tapering toward incisal aspect approximately 1 degree.

While a certain amount of bulk is advisable and desirable, from the standpoint of color reproduction, it is unwise to depend on bulk of porcelain for strength. From practical experience, it has been observed that a moderately thin, well-supported mass of porcelain will tolerate greater stress than will a much thicker unsupported mass of the same material.

It is difficult or virtually impossible to observe and measure accurately the forces acting during mastication. The test which most closely approximates these forces is the "modulus of rupture" test. This is made to determine the force in pounds necessary to fracture a transverse section of a material and is used principally in testing brick, tile, terra cotta and glass. This test combines shearing stress, compressive stress and tensile stress all in one operation. The measurements made in inches give a result in pounds per square inch required to fracture the specimen. Such a test approximates the forces in mastication to which practical porcelain restorations are subjected better than any other static test known.

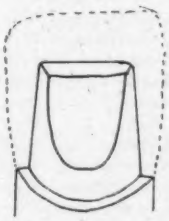

Fig. 3.—Slightly concave lingual surface of preparation area.

The size of the specimen used for this and other tests as shown in the accompanying table was 5 × 5 × 31 mm. before firing, with a volume of 732 cc.

The tests made upon these specimens determined the specific gravity, or density, the volume and linear shrinkage and modulus of rupture. High-fusing porcelain was used, all specimens being subjected to the same firing technic. (Fig. 1 and Table I.) These results indicate that, regardless of the method of condensation on the consistency of the mix, there was less than 0.1 difference in the

specific gravity or density, while the volume shrinkage varied as much as 10 per cent, depending on the method of condensation. So far as the modulus of rupture test is concerned, the tests showed that the greater the shrinkage, the less the transverse strength.

The condensation or density of the unfired mass affects shrinkage during firing. Clarke[1] claims that, for practical work, the amount of linear shrinkage varies from 9 to 20 per cent. Felcher[2] states that high-fusing porcelain shrinks from 14 to 18 per cent. Gill[3] states that certain high-fusing porcelain shrinks from 15.3 to 23 per cent. All three authors agree that the degree of condensation of the plastic unfired mass plays a very important part in the shrinkage during firing and that condensation produced by vibration causes the greatest degree of density and consequently the least shrinkage.

The amount of stress, as indicated by the modulus of rupture tests conducted by Fitzgerald,[4] Moldal[5] and myself,[6] show that certain high-fusing porcelain tolerates from a minimum of 4,200 to a maximum of 9,556 pounds per square inch transverse stress, the test that combines shearing, tensile and compressive stress. This would indicate that, under normal conditions, the material would have adequate strength.

There are, however, other conditions that affect the strength or durability of baked porcelain restorations in the mouth: the matter of impact force, strains set up in the finished product and the form of the prepared tooth that receives the applied stresses at various angles to afford maximum direct resistance, shearing resistance or wedging resistance, as well as close adaptation of the porcelain to the preparation area. Much of the success of the restoration in overcoming these conditions lies within the control of the operator in so shaping the prepared tooth that it offers the maximum resistance to and proper distribution of the applied stresses.

Resistance and retention form is an established principle in any cavity preparation for the reception of any type of filling in order to insure permanence of the restoration. For the same reasons, the preparation of a tooth for the reception of a porcelain jacket crown must embody principles which will not only prevent the dislodgement or loosening of the crown, but will also embrace features, in the form of the prepared tooth, that will take into consideration the limitations of the material used in constructing the crown, and, in producing this form, combine the resistance and retention form to meet and overcome the stresses to which the fused porcelain restoration will be subjected.

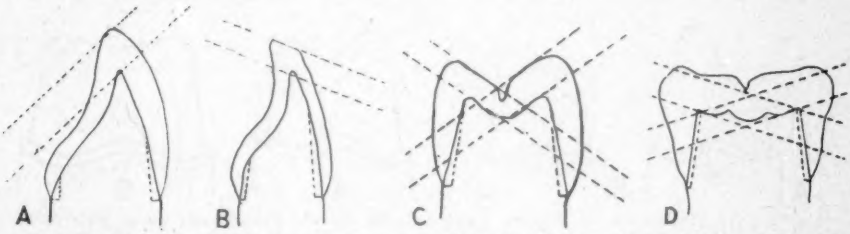

Fig. 4.—Worn bevel of incisal edge or cusps of teeth, which are best guide in making this portion of preparation, stress being delivered at right angles to preparation area at that surface.

When considering the resistance form necessary for a satisfactory porcelain jacket crown, we must be fully aware of the limitations of the material, its friability as compared to any of the metals and the effect of both direct and leverage forces, which it must tolerate

if it fulfils its purpose in the dental arch.

In considering the friability of porcelain, the resistance form of the preparation area should be such that the maximum strength of the porcelain is insured under stress. In order to accomplish this in the preparation, all planes should be so prepared that they receive the applied stress at right angles; which means that the force in the direction of the long axis of the tooth would be received by a shoulder cut at right angles to the long axis of the tooth. This applies more particularly to the labial and lingual portions of the shoulder, rather than the proximal, as these present sloping surfaces. (Fig. 2.)

The form resistant to direct stress applied to the lingual surfaces of the upper anterior teeth should present a broad, slightly concave surface to offer the maximum of resistance and support of the porcelain. (Fig. 3.) While the incisal portion of the preparation area, which is subjected to the forces generated by the protrusive movement of the mandible, can best be made by preserving the worn bevel which is found upon the natural tooth before the preparation is begun (Figs. 4 A, 4 B and 4 C), this varies according to the inclination of the condyle path and the position that the teeth occupy in the opposing arches, varying between a deep overbite, end-to-end and crossbite. (Figs. 5 A and 5 B.)

The resistance form of the posterior teeth is regulated by the cuspal inclinations. Here also, the natural wear influences the preparation, varying from acute to obtuse angles upon the occlusal surface. (Figs. 6 A and 6 B.) In general, if an even thickness of tooth structure is removed from the occlusal surface of the posterior teeth to allow for an adequate thickness of porcelain, we can be assured that the resistance form of that occlusal surface will be correct. The amount and location of tooth structure removed should be determined with the idea of supporting the porcelain, leaving as little unsupported or overhanging porcelain as is possible, rather than depending on the bulk or mass of material for strength or resistance to stress. In short, the resistance form is the shape or form given to a tooth preparation that will enable it best to withstand the stresses of mastication. It is important in direct ratio to the exposure of the crown to the force exerted in bringing the teeth into any of the movements or positions during occlusion.

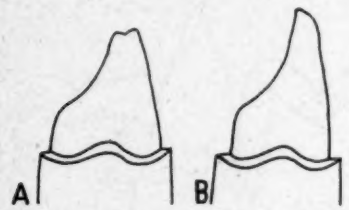

Fig. 5.—A: Preparation of anterior tooth for end-to-end bite. B: Incisal bevel on upper central incisor reversed for crossbite.

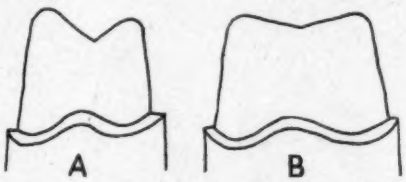

Fig. 6.—A: Preparation where little occlusal wear has taken place, cusps are high and grooves are deep. B: Preparation of posterior tooth where occlusal surface is worn to practically flat plane.

Retention form is so closely associated with resistance form that there is little difference so far as the preparation is concerned. Convergence toward the incisal or occlusal surface should not be more than 1 degree from the right angle shoulder at the gingival surface; merely enough to allow removal of the impression of the preparation area without distortion. If the shape of the preparation area results from removal of an even thickness of tooth structure or its equivalent in a gold casting, this form will be

adequate to prevent a tendency toward displacement by rotation, which would certainly be the case if the preparation area were cylindrical or cone-shaped.

Although it must be recognized that there are variations from the foregoing to meet certain definite requirements, the farther we depart from the ideals before mentioned, the more we court disaster. There are a few variations that merit mention: first, the shoulderless crown, used principally in the lower central and lateral incisor locations and occasionally on bicuspids where the gingival portion of the root is extremely narrow mesiodistally and presents concave surfaces upon these areas. Coupled with a well-crowned coronal portion of the tooth, it presents a very serious problem in a conventional type preparation without involvement of the pulp. In such cases, the crown portion of the tooth is tapered at a 1 degree angle to the long axis of the tooth to a point just beneath the free gingival margin, as much tooth structure as possible being preserved mesiodistally to protect the pulp as well as to support the porcelain, the feather edge of which extends just beneath the free gingival margin.

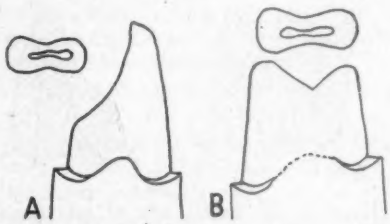

Fig. 7.—A: Preparation for lower anterior tooth in younger person when gingival portion of root is constricted. B: Preparation for upper bicuspid with root constricted mesiodistally.

From the standpoint of resistance or retention, the shoulderless crown can meet these requirements, as explained by Grubb[7]:

Considered from the viewpoint of function alone, a jacket crown in a preparation without a shoulder on any surface offers ample resistance. There is less overhang of unsupported porcelain. Moreover, the pressure developed by a slight deformation of the prepared tooth due to the compressibility of the dentin would be transmitted to and be absorbed by the entire crown.

However, from the standpoint of future disease of the surrounding soft tissue, this type of preparation is far from ideal. A feather edge of porcelain is always sharp and rough and, owing to the inherent qualities of the porcelain material, these thin edges are friable and easily fractured, sharp, angular irritating surfaces resulting which not only damage the soft gingival tissue, but expose to the fluids of the mouth a portion of the dentin of the prepared tooth.

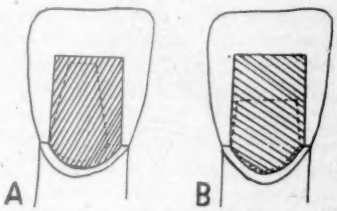

Fig. 8.—A: Gold casting that prevents unsupported bulk of porcelain at proximal aspect. B: Insufficiency of tooth structure remaining to properly support porcelain. The tooth must be built up with gold casting to ideal form.

On the other hand, if a blunt, rounded edge is made, contour of the gingival portion of the crown is exaggerated, and this is damaging to the gingival tissues and, in addition, adversely affects the appearance by providing an inharmonious tooth form.

There are, perhaps, cases wherein the conformation of the crown and root portion of the tooth is such in relationship to the pulp that it would be advisable to have a shoulderless portion upon the prepared root. This would be true in a younger person in whom the pulp is extremely large and the mesiodistal di-

ameter of the root portion is extremely narrow. In such a case, the prepared tooth could have a properly prepared shoulder on the labial and lingual aspects, tapering out and terminating just beyond the angles proximally. (Figs. 7 A and 7 B.) While such a preparation is not ideal, it is protective to the pulp of the tooth and, at a later date, when the pulp has receded sufficiently to permit the formation of a proximal shoulder, such a preparation should be made, the original restoration being considered as a temporary expedient.

So far, we have considered teeth having abundant tooth structure in which to make an ideal preparation. Unfortunately, there is not always a sufficient amount of tooth structure remaining after all carious and weakened areas have been removed to permit such a preparation, and if we would have adequate support for a jacket crown, it is necessary to reproduce the lost tooth structure by means of a gold casting, regardless of whether or not it is a vital or pulpless tooth. If the tooth is vital, the preparation is made so that a wax pattern (Figs. 8 A and 8 B) of proper form and retention can be made and duplicated in gold. In pulpless teeth, a gold core with a dowel extending into the root canal for retention can be made, the prepared area being formed in such a manner as to prevent splitting of the root under stress. (Fig. 9.) These are cemented to place and treated, so far as further construction is concerned, as tooth structure.

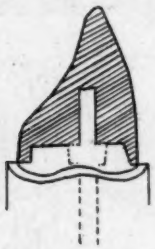

Fig. 9.—Gold core made to build up pulpless tooth to ideal form to support porcelain and prevent fracture of root due to leverage.

This method of making use of a gold core can also be used in certain cases (Figs. 10 A and 10 B) wherein, for esthetic effects, it becomes necessary to use a jacket crown as a bridge abutment. The gold core can be constructed with a proximal extension which will afford a soldering joint for the bridge attachment.

While, from a mechanical standpoint, it has been shown that proper form must be obtained in the preparation to prevent overhanging or an unsupported bulk of porcelain to insure a durable and satisfactory crown, it must be kept in mind that handling of the porcelain material itself during the building up of the porcelain plays an important part in the strength of the finished crown.

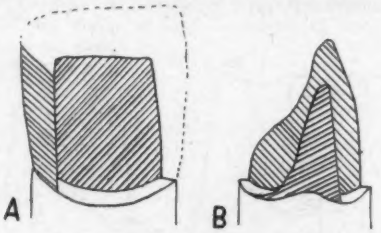

Fig. 10.—A: Labial view of gold casting with proximal extension for soldering, making possible use of porcelain jacket as bridge abutment. B: Proximal view of casting.

There has been a general belief in the profession that there is a great variation in the strength of high, medium and low fusing porcelains. This has not been borne out by the investigations of Fitzgerald,[4] who found that in strength each was comparable to the others, although, in general, the high fusing porcelains have the highest modulus of rupture, and the low fusing, the lowest modulus of rupture; but the variation was so small that the indications were that it is not necessary to use high fusing porcelain to have adequate strength for restorations.

There are other factors in the strength

of the finished porcelain product besides the fusing point. The constituents of porcelain include flux, which has the lowest fusing point of all of the ingredients and which, upon fusing, forms a bond that unites the higher fusing materials. Searle[3] writes:

> The nature and amount of the bond largely determines the strength of ceramic materials at various temperatures. In conjunction with the bond, particle size and shape are to be considered. In ceramic materials, the maximum strength is obtained by the use of irregular, angular grains of numerous sizes which interlock freely.

Clark[1] found that the texture and strength of porcelain was at its greatest at the point where vitrification is complete. In order to produce the necessary translucency and glaze to satisfy esthetic requirements, and a non-irritating surface in contact with the soft tissue, we must carry the fusion beyond the point of complete vitrification.

Fusing of porcelain permanently affects its physical properties; that is, it does not return to its original condition upon cooling, as metals do. Metals can be fused repeatedly and, upon cooling, each time revert to their original condition. Porcelain, subjected to repeated firing, begins with the condition that was produced by the previous firing and progresses from that point. With each successive firing or with increases of heat, the pores or blebs enlarge, owing to the formation of gases; the translucency increases; the strength decreases and a colorless, glassy, highly vesicular mass results, tending toward the spherical. Therefore, if it were possible to produce an accurately fitting and contoured crown in one bake, stronger restoration would result than one subjected to several firings. There is one other consideration which, if neglected, often results in failure of the crown. That is the provision necessary to accommodate the crown for the normal occlusal wear.

Contact with highly glazed porcelain causes almost no wear or abrasion upon human enamel. There is always occlusal or incisal wear on natural teeth, at varying rates in the mouths of different persons. If no provision is made upon the glazed porcelain for restoration of the wear, it soon results in traumatic occlusion with a labial displacement of the entire root and crown in the case of the upper anterior teeth, or a fracture of the crown due to impact force, or a breaking down of the investing tissues.

All of the foregoing results can be avoided by etching slightly the highly glazed portion of the crown that contacts the opposing teeth during any of the movements of mastication as disclosed by the use of carbon paper. This etched surface, in contrast to highly glazed surfaces of porcelain, is highly abrasive and will cause wear of the opposing teeth equal to the wear of attrition upon the the natural teeth in the arch. These areas, incidentally, are the only surfaces of the entire crown where unglazed porcelain is permissible.

If unglazed porcelain touches the approximating teeth, the interproximal wear, which is constantly progressing, soon destroys the normal contact point, rendering it flat and allowing the impaction of fibrous foods, with its attendant damage to the interproximal tissues. If unglazed or etched porcelain touches the soft tissue of the gingivae, an irritation and inflammation results, and if the labial or buccal glaze is destroyed, the translucency and color are destroyed and there is an accumulation of stain and débris.

To those who are seriously interested in the improvement of their knowledge and technic upon this subject, I can only recommend that they read and reread the literature I have referred to in this paper, and to those who are inclined toward research, I can suggest that there still exist a great number of unsolved problems regarding baked porcelain.

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DENTAL REHABILITATION: REPORT OF A CASE

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A YOUTH, aged 19, a native of Iowa, had had the usual childhood diseases and an unusually severe attack of scarlet fever when he was between 8 and 10 years of age. When examined, he was rather thin, but apparently healthy and working hard. However, his pulse rate was consistently above 90. He suffered from a severe degree of closed bite. (Fig. 1.) His father, as he recalled, had a similarly atypical dentition.

Fig. 1.—Original closed-bite position.

with partial anodontia, and had lost his teeth prematurely. The mother had normally formed teeth, but they were also lost at an early age. The other children's teeth were normal.

Case presented before the Paul Revere Study Club, San Diego, Calif., March 22, 1943.

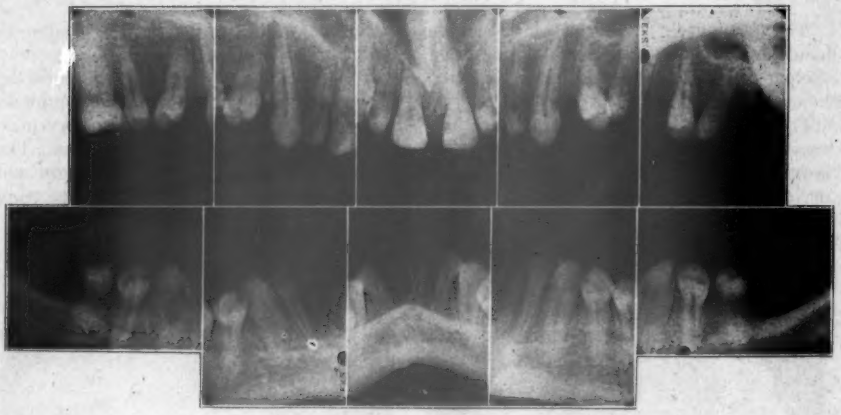

Fig. 2.—Roentgenographic survey of case.

Fig. 3.—Study models of teeth showing original closed bite and opening wax splint.

Fig. 4.—Comparison of study casts in original closed bite position and with splints in place. The maxillary central incisors were removed to show the gold castings simulating two Class III inlays between the central incisors.

The psychologic load carried by one so handicapped, and the schoolboy jibes that the patient must have endured were reflected in a very retiring attitude.

From the models and x-ray picture, it is seen that three teeth were useless. The lower anterior teeth were retained, but the deciduous central incisors were resorbed and incisors has not so far been a source of trouble.

It was planned to mount a bimeter on the castings and thus determine the optimum bite opening at which the masticatory muscles could work at maximum efficiency. The prominence of the maxillary incisors and the presence, although in an intruded erup-

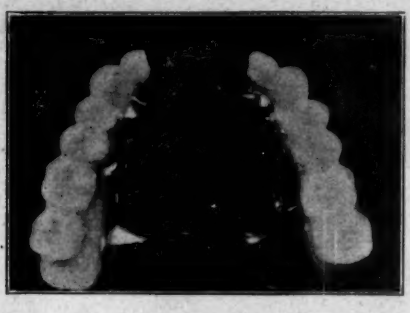

Fig. 5.—Occlusal view of maxillary splint.

Fig. 6.—Close-up of patient's mouth with splints in place.

Fig. 7.—Appearance of patient with splints in place.

there was an upper right peg-shaped posterior tooth which it was impossible to clasp. These three teeth were extracted and a number of required restorations were made. Rests were then prepared and hydrocolloid impressions taken. Skeleton chrome-cobalt castings were prepared. A very small supernumerary tooth between the upper central tion state, of the few posterior teeth made impossible the use of the bimeter.

Owing to the imminent induction of the patient into the Army and his well-warranted fear of ridicule, it was decided to attempt an empiric treatment of the case. To extract all the teeth or even those in one arch was not believed justified. The teeth of the op-

posing arch would have to be disfiguringly long to open the bite appreciably.

About twelve alternate layers of softened baseplate wax and tinfoil were built up to a 10.5 mm. opening. The patient was instructed to close in the position where he could bite hardest. It was recognized that this maximum biting position is usually 0.5 mm. protrusively from the true centric position. This was, however, believed the best method to start with, adjusting the finished case in the mouth, since the patient could retrude the mandible at any bite opening fully an inch; a condition which was esthetically untenable and could, of course, give gothic arch tracings of any intra-oral dimension. The bite opening selected was empirically an "at rest" position where the patient could lick the lips and have a 4 mm. clearance between wax bite-blocks. This was thought to be a safe "at rest" clearance, with maximum esthetic effect.

At the determined opening, wax removable partial jacket teeth were carved, being later duplicated in tooth shade acrylic as an occlusal onlay attached to the chrome-cobalt castings. Undercuts on the cast teeth had been filled in previously and the waxed-up removable jackets were brought down only to the height of convexity of the teeth and were removed frequently to insure shade. The missing posterior teeth, maxillary and mandibular, were also waxed in on a distal extension, and three mandibular incisors were supplied. The only teeth not partially capped by these removable partial dentures were the maxillary central incisors. These two teeth were already abnormally large in contradistinction to the undersized remaining teeth. Esthetically, these prominent teeth were corrected somewhat by a soldered-on gold casting simulating two Class III inlays on the mesial surfaces of both central incisors. This eliminated a prominent space, caused by an excessively broad labial frenum.

Difficulties were encountered in placing the finished partial dentures in the mouth because of undercuts on the teeth that had not been provided for. This was corrected by the use of carbon paper and indicator gel in connection with the master casts.

After seating the partial dentures in the mouth, no adjustments were attempted the first day. The patient was warned of possible difficulty in speech and mastication. He was also advised to expect a bursitis of the mandibular joints and muscle-ligament difficulties.

The next day, as had been expected, the true centric position at the established bite opening was found to be about 0.5 mm. distally from the maximum biting pressure point used. This was corrected by selective spot-grinding. In the next four days, no muscle or joint soreness developed. Speech improvement progressed. One lower left bicuspid was a trifle tender for a few days.

On the evening of the fourth day, the patient ate a complete fried chicken dinner in company with fifty dental study club members, who apparently noticed nothing unusual in his mastication. In this short interval, his social adaptation had reached a point where he willingly submitted to a demonstration of his dental deformity and corrective appliances.

After several weeks, the patient had the situation well in hand. He could masticate all types of food and could bite into apples easily. His improved outlook included at least contemplation of public-speaking classes. The Selective Service Board called him after allowing time to complete this dental work. He said, "I sure hope the Army will have me now!"

Commonwealth Building.

DENTAL PRACTICE AND DENTAL EDUCATION IN THE FUTURE; WITH CONSIDERATION OF SOCIAL AND HEALTH ASPECTS

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INTRODUCTION

DENTAL literature during the past ten years and more has presented many predictions of impending changes in dental practice expected to be induced by social changes in the world of tomorrow. In the same period, much has been published regarding changes said to be needed in dental practice to meet the requirements of advancing knowledge in the biologic phases of dental science. However, so far as I am aware, there has been no serious attempt made to match social change with advancing medicodental demands and, from such juxtaposition, to evolve a definite and realistic program for the future which will discharge the responsibility of the dental profession to the public.

As a preliminary to the discussion of the problems involved, let me remind the reader that there are two kinds of thinking about any subject involving the actions of groups of human beings. One involves emotional thinking; the other, logical thinking. Recognition of the existence of these types of thought assists in self-analysis as occasion requires. Each one has its proper place in the lives of each of us. But it is very important that we recognize each type for what it is and restrict it to its proper field. Needless to say, the subject of this paper should be approached from the standpoint of logic only, and that approach may not be easy. It is desirable too that we consider the solutions proposed in a detached frame of mind, freed as far as possible from the inhibitions imposed by custom and the heritage of the past.

THE PROBLEMS INVOLVED

Before we can develop an inclusive scheme for future dental practice, it is necessary to appraise the problems that dentistry will be called upon to meet, not only in terms of the conditions found in the mouths of individuals, but also in terms of dentally affected individuals in the mass. In other words, we must proceed on the assumption that dentistry will have a social obligation as well as responsibility to individual patients.

The social obligation of dentistry involves consideration of the spread and severity of dental disease in the community—the size of the job to be done—and, along with that, the financial implications of a dental health program applicable to the entire community. All of these elements, the social, the economic and the purely biologic, enter into the question.

PREVENTION THE FOCAL POINT

In approaching the consideration of dentistry of the future, thought naturally turns to prevention of disease as the desirable nucleus of such practice, and I mean here true prevention, not merely the early correction of dental caries. There may be a feeling on the part of some dentists that a discussion of preventive dentistry would be academic at the present time, but I am convinced that knowledge of true prevention is now available.

As we survey the knowledge and means for prevention now at hand, it seems probable that immunity to dental disease on a broad scale is to be gained chiefly through correction of food habits and especially semiprivation as regards certain foods. But the people of today cannot be expected to adhere completely and at once to a restricted dietary, whatever its announced advantages, except after a period of education.

Investigations[1] as to the effect of ingestion of fluorides on the dental tissues have given strong hope that, by adding proper amounts of this element to the water supply or providing it in other ways, the incidence of dental caries can be appreciably reduced. Possibly the most satisfactory answer to the problem from the practical standpoint will be a combination of a fluoride supplement and a balanced dietary.

However, although we may expect to reduce dental disease appreciably in the near future by preventive measures centering in dietary improvement or the addition of fluoride to drinking water, the need for a type of dental service that I have called protective dentistry, that is, early care of defects, will continue to be felt to a certain, but in time a diminishing, extent.

Caries Reduction through a Supervised Dietary and Physical Regimen

The possibilities of the prevention of dental disease through dietary regulation have been brought out by several dental investigators. It may be of interest to refer to the effect on caries control of a regimen not set up with a dental result in mind.

At the Guggenheim Dental Clinic, I have for ten years made special note of dental caries incidence in new preschool patients. The figures, uniformly high through that period, have been presented in the annual reports of the clinic. In 1941, separate counts were made on a group of orphaned preschool children placed in foster homes by a voluntary agency. These children, although not receiving in all respects what we now at the clinic regard as the optimal diet, had a better diet than the average child not so intelligently and carefully supervised. Their general health was also carefully supervised. In these foster home children, the percentage having dental caries and the average number of cavities per child for each age from 3 to 5 were approximately half those for the unsupervised children. In the 2-year-olds, the difference was much greater.

I think it is clear, then, that we can achieve measurable reduction in the incidence of dental disease by such means as I have mentioned. It is, of course, well known that we can also provide tooth protection by early treatment when disease occurs. I therefore claim that there is within our grasp the possibility of tremendously reducing tooth morbidity and tooth mortality at an early date if dentistry will but apply itself to the attainment of these objectives. And this achievement will of itself contribute to a desirable alteration in the nature and scope of dental practice.

Animate vs. Inanimate

Stillman has, over the past ten years, attempted to turn the thoughts of dentists to the biologic, what we may call the "life," aspects of dental problems as contrasted with those things that relate to the inanimate or restorative phases of dentistry. He truly states that if dentistry is in fact a branch of the healing art coequal with the recognized specialties of medicine, a fact proclaimed by Gies nearly twenty years ago, it should focus the attention of dentistry on those things that have life, that have resistance and recuperative power, as well as susceptibility to the diseases with which dentists are daily confronted.

This is the underlying theme of my paper—that the teeth as well as their

surrounding tissues are vital and a part of the living body. It follows that to keep the teeth in the mouth and in a healthy condition is the chief concern of the dentist. As a corollary, I propose the thought that when the teeth succumb to disease and are extracted, there should logically be a diminished interest displayed in them by the dental physician; that essentially his job terminates when the natural teeth have been lost.

I repeat that the teeth and their supporting structures are vital and I include in this category even the enamel perhaps. Despite this fact, self-repair of the hard dental tissues after macroscopic damage has occurred is, of course, not to be expected. The fact of vitality should, however, affect our thinking in regard to their care, especially from the preventive standpoint.

On the other hand, the periodontal tissues have a high order of vitality because of their vascularity, which assures potential resistance to disease and, to a marked extent, reparative power. They do, however, partake somewhat of the weakness of the dental tissues in that they are unable to rebuild themselves after there has been appreciable tissue loss. We need, however, to keep in mind their powers of resistance and appreciable capacity for self-repair.

The dentist has learned from earliest time to deal with the apparently inert hard dental tissues. Specifically, he has concerned himself with placing fillings in carious teeth. Stillman has called attention to this ability and has pointed out that the obvious vitality of the periodontal tissues has been at times a source of embarrassment to the dentist, indoctrinated as he has been through the years with the tenets of a mechanistic philosophy. When one has arrested decay by placing an inert stopping in the carious cavity of the tooth, it is disquieting and even confusing to have the tooth develop periodontoclasia and to realize that one cannot check the progress in the soft tissue by resort to an analogous procedure.

DENTISTRY OF THE PAST

The need for meeting the conditions that confronted dentistry in the past led to methods of practice based on expediency. The solutions of these problems, which were ingenious to a degree, answered immediate objectives and thus tended to perpetuate themselves and, further, led to certain conceptions of the scope of dental practice. All this actually retarded development of dentistry in certain desirable directions. For example, dentists, having failed in the past to find ways to preserve the natural teeth, turned to their replacment with artificial ones, with such success that the fabrication of esthetic functioning dentures came to be regarded by many as the ultimate function and the highest achievement of the profession. Again, success in arresting dental caries by means of fillings has undoubtedly been responsible in part for the failure of the profession to attack more vigorously the problems of the cause and prevention of this disease.

While the filling and the full denture have in common the fact that they are inert substances, the product of purely mechanical procedures, they differ widely in a very important respect, in that the filling is ordinarily placed in a vital tooth and this vitality must be respected throughout the procedure of cavity preparation and in inserting and finishing the filling. The procedure is a biomechanical one.

On the other hand, the full denture, although resting on vital mucous membrane, presents no such problems in regard to vitality. Its construction and even its adjustment are matters entirely in the realm of mechanics, with, of course, suitable consideration for esthetics.

These facts, together with the advancing possibilities of true prevention of

dental disease, inevitably affect the trends of dental practice and dental education.

I do not by any means disparage the achievements of dentistry in the past, mechanistic though they are in large part. Mankind has reason to be grateful to dentistry for what it has done, and dentistry itself may well be proud of its achievements. Nor do I suggest that, even in the future, dentists can completely relegate mechanical procedures to the museum. In fact, dentistry must continue to apply mechanical principles of a highly intricate nature in controlling dental disease when it does occur. Digital skill and mechanical sense will continue to be needed; but we must realize that today we have access to biologic facts and to scientific methods that were not available even a few years ago. If this advancing knowledge leads us in a somewhat different direction from that followed by our distinguished professional forebears, we owe it to our profession to tread the path boldly and seek new heights on which to plant our flag.

We must keep ever in mind that dentistry today stands on the threshold of the accomplishment of prevention both of caries and of periodontoclasia. Even in the field of malocclusion, there is beginning to be hope for prevention. It is no longer necessary to adopt a defeatist attitude when faced with rampant caries or rapid destruction of periodontal tissues. I do not mean to imply that we can prevent these diseases in every patient, for there is wide variation in individuals, but I am sure that we can accomplish this for the great majority of those who will fully cooperate by following our instructions.

The ideal of dentistry is primarily the prevention of dental caries, periodontoclasia and malocclusion, and only secondarily the early correction of these conditions when found. Dentistry does not now in its method of practice sufficiently stress these aims. Attainment of the goal of prevention will be slowly and for a long time, imperfectly achieved; it will require large scale testing of methods now to be proposed and an intensive campaign of health education. It becomes, however, a definite part of the program of the dentistry of the future. With this in mind, together with consideration of the biologic and mechanical relationships previously mentioned, I propose the following realistic program for dentistry in the future. This may be stated in the form of a list of objectives arranged in order of diminishing desirability and professional satisfaction, as follows:

Objectives of Dentistry for the Future

1. Prevention of dental disease and malocclusion.

(a) Reduction of incidence where total prevention is not attained.

2. Early prophylactic or corrective care when disease or abnormality impends or occurs.

(a) Filling carious teeth.

(b) Treatment of periodontal conditions.

(c) Treatment of malocclusion.

(d) Effective therapeutic or surgical intervention in conditions having potential or actual systemic complications.

3. Replacement of individual missing teeth by

(a) Crowns.

(b) Bridges.

4. Replacement of multiple missing teeth by

(a) Partial dentures.

(b) Full dentures.

Please note that the professional satisfaction in accomplishment of these objectives diminishes as the list progresses, No. 4 being the least satisfying accomplishment, No. 1 the most satisfying. There will, of course, be no quarrel with this statement as a matter of principle. What is needed is implementation of this principle in dental practice and dental

education. Implementation, in its turn, requires approach to dental problems with a clear and constantly maintained conception of the foregoing objectives in the order of their importance.

THE FIELD OF THE GENERAL PRACTITIONER

The management of periodontoclasia and malocclusion, as well as caries, should be in the hands of the general dental practitioner, primarily because of their wide prevalence, together with the serious effects of lack of treatment. Figures on prevalence of periodontoclasia are lacking, but there is general recognition of the broad spread of this disease, especially among adults. The incidence of caries, especialy among children, has been carefully studied and well publicized.

On the other hand, the dental profession as a whole does not, I believe, appreciate how much malocclusion there is in the child population. In a recent survey of 783 children at the Guggenheim Dental Clinic, 152 of whom were between 2 and 7 years and 631 from 7 to 12 years, it was found that 38 per cent of the children below 7 years and 60 per cent of those between 7 and 12 years suffered from malocclusion, of various types and seriousness.

The fact that the dental colleges today do not usually train undergraduates to treat malocclusion and that college training in the treatment of periodontoclasia is still, for the most part, not adequate is not a valid argument against the proposal to give more advanced training in both fields. The answer lies in modification of the dental curriculum so that the necessary training may be given. Suggestions for this adjustment will be made later.

I make the foregoing proposal for expanding the field of the general practitioner with full understanding of the complexities of the problems presented in treating many advanced cases of periodontal disease and many of the more severe types of malocclusion. Such cases will have to be referred to specialists as at present and, of course, specialist training will continue to be needed; but a large percentage of cases in both fields can be cared for adequately by the well-trained general practitioner, particularly as regards preventive and early treatment. The main point is that these disorders affect vital oral tissues and therefore the dentist should be trained to treat them.

CORRECT DIAGNOSIS IS A REQUIREMENT

It is obvious that treatment in all of the fields mentioned must rest on diagnostic skill. This involves not merely determining the existence of pathologic or abnormal states as discovered by mouth examination and the roentgenogram, but also discovering the background of these conditions. This will commonly involve some investigation of systemic conditions. Such a study can be made only by one who has had some training in medical science, and by medical science I mean not merely the so-called basic sciences, but also the science of clinical medicine.

ORAL SURGERY FOR THE GENERAL PRACTITIONER

In the field of oral surgery, the general practitioner should have competence beyond that ordinarily found. Here, of course, as in the other fields mentioned, unusual and complicated cases will have to be referred to the specialist; but the general practitioner should be able to perform average extractions, remove root fragments and handle the ordinary infections of the jaws. He should know the fundamentals of the surgical management of the soft tissues.

THE SOCIAL DENTAL PROBLEM

It is generally agreed that not more than 25 per cent of the population receive regular dental care. The remaining 75 per cent receive only occasional care

or, at the most, have an occasional extraction. None in this group can be considered as receiving the care necessary for dental health and therefore general health.

What is the extent of the problem in terms of dental needs as of the present day? Surveys made in widely scattered areas in this country indicate that dental caries, to say nothing of periodontoclasia, is virtually universal. Probably the highest rate has been announced at the Guggenheim Dental Clinic[2] in New York, which gives treatment to children only. There, caries experience, as exemplified by new or filled cavities, is found year after year in more than 99 per cent of the children under observation. New surfaces become involved even among those receiving, on a recall basis, a type of dental care that measures up to the accepted standards of today. The average number of cavities found in new patients is between 8 and 10, in recalled children between 2.5 and 3.5. The latter figures, which apply with but little variation to all the ages from 2 to 16 years, indicate that susceptibility to dental caries does not diminish appreciably under the influence of a so-called preventive program.

A searching analysis of the needs of adults in a study made by the American College of Dentists[3] was based on records of the Dental Health Service, a non-profit dental clinic in New York. It was indicated by that study that while the caries rate diminishes after age 21, dental care of some sort continues to be needed. It is a well-known fact that periodontoclasia begins to take its toll after age 35, especially with an earlier loss of neglected teeth. In this adult group, also on a recall basis, both fillings and other forms of treatment were found to be needed to an over-all extent equaling that required for the children, and this at a steadily continuing rate.

The usual approach to the problem of dental disease has been an attempt to get both child and adult to the dentist for corrective service, the only kind of service dentistry has so far been able to offer. To effectuate this on a nation-wide basis would require a considerable increase in the number of dentists even if dental care for all were started early in childhood and if practice were to continue as at present; that is, under present accepted standards and methods. Furthermore, the cost of dental care of the scope indicated would be prohibitive in relation to the total national economy. Standards cannot safely be lowered, hence new methods must be devised; that is, new methods of conducting practice.

An unexpressed but nevertheless real appreciation of the scientific and economic dilemma just stated is one of the most effective barriers to full acceptance by those interested in public health of a community dental health program based on the principles and methods of practice now in vogue.

The Physician Looks at Dentistry

There is another point of view that should be discussed in considering dental practice of the future; that is, the attitude of medicine toward dentistry. Dentists sometimes complain that physicians are not interested in dental problems. It is true that they are not interested when they are asked to look at those problems as the dentist usually views them. On the other hand, it is relatively easy, I have found, to interest physicians in the same problems if presented in terms of why the various diseases occur and how they can be prevented.

Another angle to this problem of medico-dental relations is the difficulty, amounting almost to a barrier between the two professions, which arises, I am sure, from the part prosthesis plays in dental practice. The physician recognizes instinctively that dental prosthesis comes into the picture after life, so to

speak, has gone from the affected part of the body. Even in the filling of vital teeth, he finds himself somewhat baffled by the obvious mechanistic basis of the procedure. For these reasons, he finds it difficult to reach a common mental meeting ground with the dentist. I predict that dentists will never be accepted by physicians as health workers on an equal basis as long as they continue to be preoccupied with prosthesis as at present and to exalt this phase of practice.

To illustrate my point, let me cite a comparable situation in the medical field and the usual method of handling it, the case of traumatic injury of the leg. The surgeon applies such therapeutic measures and agencies as are indicated in an effort to save the leg and restore its function. If such efforts are beyond the possibilities of success, he performs an amputation. After recovery, a wooden leg is made. Is the wooden leg made by the surgeon? Not at all. There is no therapeutic problem involved in that procedure, only restoration of function as far as possible. Hence, the case is turned over to the trained technician. If adjustments are needed, the surgeon will advise regarding them.

PROTECTIVE DENTISTRY STILL NEEDED

I have indicated that there will be a continuing, although in time diminishing, need for protective dentistry. For that reason, we cannot, even in the interest of a preventive program, throw overboard at present the service program now in operation. We must, however, seek to bring into operation, as rapidly as possible and in a positive way, the ameliorating influence of the preventive measures now available. Dentistry must be envisioned as utilizing, in its attack on this general objective, the principle of the pincers move often carried out by modern armies. In other words, dentistry should direct its drive equally along two separate but converging roads, the one that of pure prevention, the other that of dental service. The point at which these roads meet is the control point, the point at which dental disease either does not occur or, if it occurs, is permanently checked. In this direction only lie economy, professional satisfaction and improved dental health for the public.

But the dental service program itself must be modified, probably in private practice, certainly in public health work, if prevention as well as protection is to be practiced and not merely preached. The dental practitioner must be more the dental physician and less the purveyor of dental restorations if he is to accomplish the greatest good for his patients. Each patient should be studied to determine the underlying conditions that have brought about the departure from dental health. On the basis of the diagnosis, a definite prescription should be developed looking toward the prevention of recurrence; and this prescription should by no means be limited to the mechanical procedures that may be needed.

If the dentist is to give his patients the kind of care and health supervision that his responsibilities entail, he will, as indicated above, find himself engrossed not only with operative dentistry, but also with periodontic treatment and orthodontic treatment. At the same time, he will, of course, be required to replace missing teeth by artificial restoration. All of this must be accomplished in as economical a manner as possible.

AUXILIARY PERSONNEL

In the interest of the most effective study and management of the problems presented by each patient, without forcing the dentist too deeply into detailed consideration of purely technical procedures, the use of auxiliary personnel is imperative. This is also needed in the interests of economy.

Morris, in a stimulating paper[4] read before the American Association of Den-

tal Schools, made the following pertinent statement:

> If dental service is to be provided for our entire population it is evident that over-all dental manpower as it exists today is not going to be sufficient. Service will have to be provided on an economical basis. Are you giving consideration to the training of auxiliary workers if they are needed? I could go ahead for the next thirty minutes and break down the population of this country into groups which will need special consideration and present special problems in respect to dental training.

The nature and extent of use of auxiliary personnel will, of course, vary according to the conditions under which the dentist is working. These will range from private practice to clinic practice on either a voluntary or an official basis.

Whatever the mechanism for the delivery of dental service, economy demands that procedures which can be performed by persons specially trained in them, but who are not necessarily fully and expensively trained dentists, should be so delegated.

The auxiliary personnel that I have in mind comprises, as at present, the dental hygienist, the dental technician and the dental assistant. I propose, however, that the fields of the first two be extended to make them even more useful than at present. The suggested extension of their fields of operation will be in the interest of economy without sacrifice of quality.

By way of introduction to this topic, may I call attention to the development of auxiliary personnel by the medical profession. The trained nurse was, of course, the first medical auxiliary. Her place in medical practice is well known, as are also the considerable privileges and responsibilities that she has in the care of patients. The giving of hypodermic injections serves as an example. In addition, there has been developed a considerable group of auxiliaries whose functions and even existence are not so widely appreciated. Thus, we have the pathologist, the bacteriologist, the roentgenologist, the physiotherapist and others. All of these work under the orders and control of the physician. These auxiliaries have been developed, essentially, by the medical profession, and the relationships between them and physicians are mutually satisfactory. The same cannot be said of the optometrist, chiropractor, dietary therapist, etc., who have come into existence largely because of failure of the medical profession to realize that there might be a place for them and to provide that place.

THE DENTAL HYGIENIST

Dental hygienists were originally brought into the profession in order that they might give prophylactic treatments, training for which could be had in a short professional course. Back of this move was the thought of economy. Dentistry has hesitated to take the logical steps to follow up this beginning. Now is the time to act if dentistry is to discharge its social obligation to the public; namely, to provide all necessary dental service at the lowest cost consonant with good quality.

The next step for the dental hygienist is one already taken in New Zealand and advocated here by Millberry[8]: the filling of children's teeth. American dentists who have visited New Zealand and have seen the work done by these young women attest its satisfactory quality. It is clear, in other words, that they can be trained to function in that field.

I should train the dental hygienist to place amalgam and other plastic fillings in cavities in the teeth of children up to the age of 14; in other words, through the preschool and public school ages. They would perform no extractions, treat no abscesses and handle no other surgical procedures and no pulpotomy or other pulp treatments. They should, as in the prophylactic field, work under effective, although not necessarily continuous, supervision of the dentist.

I shall not in this paper attempt to set up a schedule for their training, but I am satisfied that in one year additional to the present technical dental hygiene course, followed by a year of externship, they can be trained in operative dentistry of the scope that I propose. Licensure for this work would, of course, be needed, together with annual registration.

THE DENTAL TECHNICIAN

For the dental technician, I propose training that will enable him not only to process full and partial dentures as at present, but also to take the impressions for them, insert them for the patients and make such adjustments as may be needed. This work also should be under the effective supervision of a dentist.

I realize that this proposal will raise a specter that the dental profession has been trying to lay for years; but I believe, first, that it is a logical development and therefore one that the dental profession must sponsor, and second, that by proper education and regulation in the form of dental supervision, the dental technician can and will be an asset and not a liability in dental practice. Of course, this further step for the technician cannot be taken precipitately if only because of present legal restrictions. By intelligent planning, the situation can be handled adequately at the proper time; and we must constantly remember that, in the denture field, the greatest possible economies are needed with reference to service for the so-called dentally indigent who, by reason of neglect, focal infection, etc., may have to lose all or most of the natural teeth.

However, in the field of crown and bridge work, except for using removable bridges retained by simple clasps and not using lug seats inserted in the teeth, the dental technician would be limited as at present to laboratory procedures. Preparation of teeth to be crowned or used as abutments, taking of impressions and insertion of such restorations would be carried out by the dentist as at present. This distinction between the two prosthetic fields is based on the fact that preparation for such structures involves cutting into the natural teeth.

A training period of two years, with high school graduation a prerequisite, as for the dental hygienist, would be adequate for the dental technician, this to be followed by one year of externship. The basic training should preferably be given in the dental college. Licensure and annual registration would be required.

Externship for both dental hygienists and dental technicians may be taken in properly supervised clinics, in dental colleges and in hospitals if facilities are available.

THE DENTAL ASSISTANT

The dental assistant will continue to perform the functions now assigned to her. I see no additional or more advanced duties for her at present. I think it is best that she be given a formal course of training which may well include instruction in first aid as well as in the usual technics carried out by the dental assistant. In time, she may also be trained in certain bacteriologic and chemical technics to provide needed assistance in diagnostic procedures.

PREVENTIVE DENTISTRY

I have indicated the mechanism for protective and restorative dentistry in the future as regards the functions of the dentist and his auxiliary personnel, but have not brought into the picture the personnel and methodology for a well-rounded approach to the preventive phase of dental practice. "Preventive phase of dental practice" is in a sense self-contradictory. Preventive dentistry or, better still, prevention of dental

disease begins and is chiefly carried on outside the dentist's office. The term has a certain usefulness, however.

HEALTH EDUCATION

The methodology of the preventive program is health education. The personnel will naturally comprise those whose job is education. Included in this group will be the dental hygienist, the school teacher and the health department staff, including nutritionists, nurses and allied workers in voluntary agencies. The dentist appears in this part of the picture as the one whose job it is to provide the technical information, the guiding hand in research and instruction to the others in the group.

Health education activity will be carried on chiefly in the school, the health department and the hospital. The health educational function of the first two is well established. Only recently, however, have dentists begun to recognize the ease of approach and the tremendous psychologic advantage of educational information that can be presented in the obstetric and well-baby clinics conducted in most hospitals. The public health nurse working out of the hospital can exert a very helpful influence, too.

Additional effort in the future must be made in the field of adult dental health education. Particularly is this true of work in the field of diet. The mothers of the country are the ones who do the marketing and prepare the food. However, opinions to the contrary notwithstanding, it is the husband who rules the house, or at least the dinner table. Hence, fathers must be prevailed on to accept changes in the daily menus if improvement is to be had.

When dental health education is included with the activities of the dentist and his auxiliaries, the total scheme for improved dental health becomes apparent. This can be presented in graphic form as follows:

DENTAL HEALTH PROCEDURE AND DENTAL PRACTICE OF THE FUTURE

Personnel and Methods

1. Health education, with special emphasis on diet.

(a) Dentist to guide research and provide technical information.

(b) Dental hygienist and classroom teacher in public school and high school, reaching school child and parent.

(c) Health department staff, including public health nurse and allied workers in voluntary agencies, reaching older groups and concentrating attention on maternal cases; also giving attention to infants and preschool children.

2. Protective dentistry.

(a) Dental hygienist, adequately trained, licensed and working under dental supervision to:

1. Give prophylactic treatment, etc.
2. Fill teeth of preschool and public school children.

(b) Dentist, fully and adequately trained for:

1. Diagnostic procedures.
2. Protective dentistry for high school group and adults.
3. Prophylactic orthodontics and treatment of simpler types of malocclusion.
4. Extractions and minor oral surgery.
5. Crown and bridge work.

3. Denture service.

Dental technician, adequately trained, licensed and working under dental supervision, for denture prosthesis, both full and partial, including taking of impressions.

MECHANICS FOR THE FUTURE

1. The mechanisms for health education have already been discussed. This is a field for intensive and continuous activity

2 (a). Protective dental service for the child can well be given in the school dental clinic or health department clinic except for those children whose parents can afford the expense involved and de-

sire to have the work done by the private dentist. As regards results, it will be far better to provide protective dental service for all children by trained dental hygienists at the taxpayers' expense in a well-supervised clinic, making this free to those who seek it, than to make an effort, as at present in a large percentage of cases, to get dentists to do this work at low fees with the inevitable consequence of work of inferior quality or falsified completion certificates.

2 (b) The services of the dentist may be rendered in the private office, the hospital or the clinic, according to circumstances.

3. Denture service will be given by the dental technician in the office of the dentist or in hospital or clinic, according to circumstances.

In the office, impressions may be taken by the dentist as at present, depending on the desire of the patient and ability to pay.

As suggested above, the dental program of the hospital should be expanded to an extent seldom found today. Particularly, there is needed a denture service for dentally indigent patients who have had all teeth extracted because of focal infection.

THE DENTIST IN THE PRACTICE OF THE FUTURE

We come now to the dentist. His services can be distributed through several channels. First, we have the private office, an institution which, I am confident, will continue to flourish regardless of the apparent trend toward socialization of health services now observed. At least, private practice will never go out of existence in this country as long as we have the system of private property. However, the percentage of people who will be able to command the services of the private general practitioner and specialist will depend entirely on the economic status in any given community.

The private general practitioner will tend to bring into his office a dental hygienist and dental technician. The dental hygienist will, as in the school clinic, fill children's teeth in addition to giving prophylactic treatment. Cases requiring full or simple partial dentures will, after investigation to determine the health of any remaining teeth, and whether there are buried roots, etc., in edentulous areas, be turned over to the dental technician, who will handle the entire prosthetic procedure, subject to review by the dentist. The dentist will then be free to devote himself to diagnosis; prescriptions for preventive dentistry for individual patients; operative, periodontic and simple orthodontic treatment, and crown and bridegwork as needed. He may practice exodontia and minor oral surgery or not as he elects. Two or more dentists might share a suite of offices in order to utilize the time of a single dental technician and dental hygienist to the best advantage.

Under certain conditions, the establishment of clinics will be a desirable procedure from the standpoint of economy of operation, and especially where it might be necessary to provide services for those unable to pay normal private office fees. In these clinics, as in the private office, dental hygienists and dental technicians will be associated with the dentist.

As a result of such changes in practice, the commercial dental laboratory as we know it today will, I believe, eventually go out of existence. The dental technician will, however, gain in dignity and professional stature.

I realize that my proposals not only lead directly to a new mechanism for providing dental care even in private practice, but also apparently minimize the important and valuable advances made by several recognized specialties, particularly pedodontics and full denture prosthesis. The latter implication is far from my purpose. As a matter of fact,

the plan that I propose could be successfully carried out only because of the availability of improved and standardized technics that have been and will be developed by the leaders and research workers in those fields. And I think there will be a continued need for specialists in those fields.

PROVISION OF DENTAL CARE FOR ALL

But it is one thing to develop new knowledge and technical advance in the dental field and another to make it available to all who need dental health service regardless of means. In that area, the dental profession has a clear-cut obligation—provision of all dental service needed for oral and general health at the lowest cost consistent with adequate quality. If dentists do not find a way to offer this, some other group will. I only add that mail order dentures or the equivalent may not be so easy to deal with in the future if the dental profession does not come forward with a concrete plan. It will not be enough simply to enunciate a set of principles buttressed by a statement of restrictions to be imposed on those who do offer plans.

Even with the best that can be done in the way of reducing costs by revising the mechanisms for giving service, it is inevitable that, for a considerable group, dental service must be subsidized. This may be done in the form of a completely tax-supported program such as is suggested for the preschool and school children and programs for adults in the lowest income brackets, or it may be a partially subsidized service for adults in the lower middle income brackets. The part paid by the individual so served may be on a voluntary annual fee basis for non-wage earners as a subscription toward the cost or on a compulsory contributory basis for wage earners. In either case, the fee should cover the delivery of certain basic kinds of service without restriction on the amount of service to be given as long as that service is required to place the mouth in a healthy, functioning condition.

Incidentally, fees collected in a voluntary enrollment plan should not be referred to as prepayment fees, as they are so often called in plans for medical care. Prepayment plans for medicine and dentistry cannot be compared. Prepayment for medical care is essentially an insurance scheme, since not every one needs to draw on the fund for service in each insured year. In the dental field, because of the constantly recurring need for dental service, prepayment is nothing more nor less than installment buying, except that the thing that is bought is paid for before it is received instead of after.

EFFECT ON THE DENTAL PROFESSION

To the question "How is all this going to affect the dental profession?" the answer is that private practice will continue as at present for that percentage of the people who can afford it, for they will continue to seek it if it is within their reach. Dentists serving this group will fare about as at present, perhaps better, since their activities will be more readily recognized as constituting an essential health service and evaluated accordingly.

Dentists serving the groups needing a subsidized service may give much of this service in the private office. Social security programs now in effect in many areas give a preview of the method of operation of such service. In many instances, the service will be given in the clinic or hospital. It is for this group, particularly, that the economies offered by auxiliary personnel will be effectuated. Remuneration will be by salary on a per session basis or a salary for full time. As plans evolve in actual practice, there may well come into existence a considerable body of dentists who will enroll in full-time service in tax-supported programs. Their remuneration and professional satisfaction will depend

in large part on the constructive activity of organized dentistry in working out the details of practicable programs.

It is clear that, in the interest of the public and the dentist, the dental profession must participate in the administration of such programs. Less obvious is the fact that the willingness of the profession to utilize all feasible economies such as those suggested here will be a potent argument in presenting the claims of the profession for such participation.

None of the changes that I envision need be abrupt if a start is made now. As the auxiliary services that I have described come into operation, the dentist will grow in professional stature and in actual accomplishment of benefits for his patients. On such a basis, I am sure dentists will not suffer financially.

DENTAL EDUCATION IN THE FUTURE

The dental educational program, if it is to prepare dentists and auxiliary workers for the conduct of dental practice as previously outlined, must be quite drastically revised. For the dentist, there must be important additions, and the making of additions necessarily implies elimination of some of the teaching material generally included at the present day, if we are to avoid marked lengthening of the course. New courses will, naturally, have to be set up for the dental hygienist and dental technician. These should be given in the dental college.

Naturally, we must decide first what we are to add to the course, and we can then determine what is to be eliminated. I shall not attempt to specify the exact number of hours to be devoted to the various subjects. These will have to be worked out. The subjects that should be given more time in the curriculum are: (a) oral and physical diagnosis, and clinical and preventive medicine; (b) periodontia, and (c) orthodontics.

The first of these, with few exceptions, is now taught by means of a course of lectures only. This instruction should be reinforced and vitalized by hospital assignment, which could be arranged as a kind of clinical clerkship in the senior year of the course. In addition, the dental graduate should be required to take a year's internship in a hospital after graduation. This should be a rotating internship with service in both outpatient and inpatient departments and in the pathologic laboratory. In each of these departments, it is necessary that he have proper supervision and instruction. Only through such experience, I am satisfied, will the dentist gain the medical viewpoint which it is so desirable that he have. Increasing cooperation of the hospitals will be needed for full satisfaction of this requirement.

This medical experience will not only enable the dentist to study his patients intelligently with respect to systemic diseases that have oral manifestations or oral disease that affects the system adversely, but will also provide the background for the evaluation of those subclinical aberrations of the system that manifest themselves in the common oral diseases—dental caries and periodontoclasia.

The second subject that I note as requiring more time in the dental curriculum is periodontia. The disease periodontoclasia first began to emerge from the shadows of mystery in the early years of this century. For at least twenty-five years, its treatment as a successful procedure has been practiced and publicized. Most colleges include instruction in this subject, yet observation of the product of many of the colleges in the eastern section of the country indicates that not enough time is devoted to the teaching of periodontal treatment. Especially lacking is instruction in oral prophylaxis, which is essential to all periodontic treatment, both preventive and curative.

As regards orthodontics, it is generally

agreed that the usual undergraduate college course of today does not teach the dentist to treat even presumably simple cases of malocclusion. He is, in fact, usually warned that he had better keep his hands off all cases of malocclusion. In an earlier day, that was undoubtedly sound advice because of the fact that orthodontic opinion as to diagnosis and treatment was not too well crystallized and too little was known as to the possibilities of preventive treatment. Today, I believe that it is possible to classify cases of malocclusion as simple or complex and to set up adequate undergraduate instruction for the recognition and treatment of the simple cases. This instruction can also cover the prevention of malocclusion where that is possible. More time will have to be given to such instruction than is being set aside today in this field. But it can be done and should be done.

The elimination of material from the undergraduate course will be largely a matter of cutting down the time devoted to certain parts of the curriculum and not of actual elimination. One subject, however, can be eliminated entirely, I believe, without serious loss. That is the gold foil procedure.

Improvements made in other filling materials offered to the profession over the past thirty years have forced gold foil into an area of limited use despite its admitted advantages. Even where now used, it can well be replaced by substitutes. I see no justification today in requiring the dental student to spend hours and hours in the technic laboratory and operative clinic mastering the technic of gold foil cavity preparation and manipulation. The verdict on gold foil has been given by the practitioner of today.

A subject in which many hours of instruction can be saved for the dental student without, however, eliminating it entirely is partial and full denture prosthesis. The student need know but little about the technics of denture construction. What he does need to know is dental anatomy and occlusion, and his knowledge of these subjects should be gained under the instruction of the professors of anatomy, physiology and orthodontics.

However, the technics of construction of artificial appliances will not be omitted entirely. Especially in the field of crown and bridge prosthesis, the dental student must be carefully trained. Here, the reason is that his preparations must be made on the natural teeth, and his appliances will be supported at least in part by these natural teeth. Their preservation in a state of health, as much as the replacement of lost masticating units, is his concern.

To give the details of the course that I recommend would require an entire paper. I hope, however, that I have indicated the direction in which we should move in developing the dental curriculum of the future.

SUMMARY

In offering a plan for the future practice of, and education for, dentistry, I have taken as my underlying thesis that the dentist is and should be a medical specialist in odontology. His sphere is the prevention of disease and abnormality of the teeth and their adnexa and the early correction of dental disorders of whatever nature when they occur. His concern is with the teeth as vital structures and not with the mouth after the teeth have been lost.

I propose extension of the fields of the dental hygienist and dental technician so that they, under supervision, may relieve the dentist of certain parts of his practice. The purpose of this is to permit him to give more attention to true preventive practice and to periodontic and orthodontic treatment.

The development of this type of practice, founded on teamwork of personnel qualified for certain tasks, will not only improve dental practice, but will also

make it more economical. This step is necessary for the proper discharge of the obligation of the dentist to the community which has given him the sole privilege of treating dental disease.

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THE ESSENTIALS OF WELL-PLANNED ORAL SURGERY

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THE practice of oral surgery and exodontia has long been considered among the oldest of the specialties in dentistry. As far back as 1778, Jourdain, in his volume "Surgical Diseases of the Mouth," says:

> The surgical diseases of the mouth, if studied with reference to their causes, their nature, their varieties, their progress, the parts involved, the period of life most subject to attack and also the operation and modes of treatment, form no small part of the art of healing. They demand, not simply a general, but a special and careful consideration, else will the routine practitioner expose those affections either to dangerous operations or to a course of treatment tedious and it may be hurtful. The field of surgery has become so extensive that no one person, however learned, should attempt to deal with the whole field and, for this reason, oral surgery as a specialty is justified.

Since then, oral surgery has made tremendous strides. The men graduating from schools are well equipped with a knowledge of pathology, anatomy and surgery and are able to cope with situations that may arise in their practices. Unless conditions are too involved, they can readily perform any oral surgery operation that presents itself.

The aim of every surgeon, when performing an operation, is a successful result. This demands a definitely planned routine including: (1) roentgenograms, (2) diagnosis, (3) asepsis, (4) anesthesia, (5) surgical procedure and (6) postoperative care.

ROENTGENOGRAMS

We cannot dispute the value of roentgenograms in operations in or about the mouth. Their value is twofold: 1. As an aid in the diagnosis and prognosis of lesions of the perlapical area of the teeth and the investing tissues. 2. As the foundation upon which we base our surgical technic.

The chronic disturbances which are disclosed by roentgenograms are: chronic alveolar dental periostitis, suppurative periodontal osteitis and cystic formations involving the alveolus.

Read at the Midwinter Meeting of the Chicago Dental Society, February 22, 1943.

Other disturbances which can be located are: (1) jaw fracture, (2) the presence of foreign bodies, (3) calcification of the pulp, (4) the presence of pulp nodules, (5) fracture and perforation of the roots, (6) impaction of teeth, (7) fracture of roots in previous extractions, (8) root resorption, (9) exostosis of apices and (10) curvature of roots.

Teeth with abnormal root ends, wide intraradicular divergences, broken down, crumbled crowns, large fillings extending below the gingiva and extensive granulomas at their apices call for a more radical procedure than do normally developed diseased teeth. These conditions cannot be observed unless roentgenograms are taken before each operation.

DIAGNOSIS

In making a diagnosis, there are several phases to be considered: (1) history, (2) pain manifestations: (a) type (b) location, (3) clinical observation, (4) bacteriologic observation, (5) general systemic examination and (6) differential diagnosis.

HISTORY

In taking the history of the patient, we receive information relating to occupation, habits, present and former diseases, pregnancy and heredity. This information may quickly lead to a correct diagnosis.

PAINFUL MANIFESTATIONS

It is the painful condition in the mouth that sends the patient to the dentist. It is sometimes very difficult for the operator to immediately diagnose the cause of the condition. Complete information should be obtained as to the type of pain and its location.

CLINICAL EXAMINATION

During the clinical examination, the following should be observed: (1) color of teeth, (2) color of gums and their condition, (3) transillumination of gums and antra, (4) exploration for cavities, (5) pulp testing, (6) edema of the surrounding tissues, (7) fistulae within the mucous membrane surrounding the teeth and (8) mucous patches in the mouth.

BACTERIOLOGIC OBSERVATIONS

Smears may be necessary for examination of the periodontal tissues of the mouth, and cultures are often necessary to determine the type of organisms present.

GENERAL SYSTEMIC EXAMINATION

The patient should have a physical examination by a competent physician, who can also determine the condition of the blood.

DIFFERENTIAL DIAGNOSIS

Differential diagnosis is a comparison of symptoms of diseases which have a similar appearance. It is a process of exclusion by which we determine the disease present.

After consideration of the foregoing examinations combined with the findings of the x-rays, we can make a correct diagnosis and can prescribe a definite treatment.

A note of warning! In acute oral infections, it is advisable to proceed with caution and due consideration of the possible results. There may be the beginning of a Vincent's infection, cellulitis, acute suppurative pericementitis, osteomyelitis or some other acute infection. Frequently, we find an infected area involving partially erupted lower third molars. Under the flaps of the mucous membrane, there is an accumulation of matter which has become a breeding pabulum for germs and the fermentation of foods. The overlying flap of mucous membrane contains fibers from the buccinator as well as the superior pharyngeal muscles. As these muscles play an important rôle in mastication and deglutition, we can readily understand the

trismus and difficulty in swallowing following the removal of these teeth. This condition should be treated before removal of the teeth.

In acute cellulitis, it is advisable to localize pus and establish drainage before any tooth removal is undertaken. For this purpose, we use hot magnesium sulfate compresses. The exception may be the case of extreme emergency, wherein the infected tooth may be the cause of extensive cellulitis jeopardizing the life of the patient. In cases of this kind, the patient should be hospitalized, the surgical operation performed and the necessary postoperative treatment instituted. From experience, we have learned that the removal of teeth in the presence of acute infectious conditions is hazardous. In this connection, I should like to quote from an article by C. W. Waldron[1]:

> Acute alveolar abscess and cellulitis with or without infection of the fascial spaces of the face and neck and unassociated with the recent extraction of a tooth offer a great problem to the dentist. The patient's one idea is to obtain prompt relief by the removal of the infected tooth. The dentist has been warned by numerous experienced surgeons that extraction of the tooth in the early stages of abscess formation, when accompanied by swelling and cellulitis, is a dangerous procedure. . . .
>
> The dentist is correct in exercising caution in cases of this type, but is beset with doubt regarding the proper handling of the patient, who may be impatient and may consult several dentists in turn, to find one who will extract the tooth. Fortunately, most patients recover without serious complication and the first dentist is condemned as one lacking in the ability to handle such conditions.
>
> Further clinical research in sulfonamide therapy in oral surgery may well make possible the formulation of a more or less routine plan of treatment in these disturbing cases. Already enough has been done to lend encouragement to the hope that dentists may soon be given authentic information for use in caring for serious infections of the jaws and associated tissues.

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ASEPSIS

Asepsis is a degree of cleanliness in which living pathogenic organisms are absent. A strenuous effort should be made by the operator to maintain surgical cleanliness in all operations. The importance and value of asepsis can readily be realized if one has ever had a patient return with an infection following surgical procedure.

We, as dental surgeons, recognize the fact that we cannot obtain the same amount of sterility in the mouth as a physician can in his field of surgery since we are laboring in an infected area, but a sincere effort should be made to obtain an aseptic field. Before any operative procedure, the mouth should be sprayed and cleansed, even to the extent of scaling the teeth in the field in which the operation is to be performed, more especially the teeth that are to be removed, should they be covered by excessive deposits of tartar. These deposits are harbors for germs and, when the forceps are applied, they break off and drop into the tooth socket, remain there and frequently cause an infection. In giving a general anesthetic, it is necessary to cleanse the mouth and remove all removable prostheses, loose fillings and large calculary deposits before the anesthetic is administered. Under nerve block, this can be done later.

The mouth should be cleansed with sterile gauze, and painted with an antiseptic such as iodine or a 1:500 metaphen solution before any local anesthesia or surgical operation is attempted.

After the field of operation has been placed in an aseptic condition, care should be exercised to avoid carrying infection into the mouth by instrumentation. Boiling instruments for thirty

minutes is the proper method of sterilization. The gauze, towels and cotton should be sterilized under steam pressure. The operator's hands should be thoroughly scrubbed before each operation. Any one assisting the operator should follow the same procedure. Oral surgery demands the same degree of sterilization in an office as does general surgery in a hospital.

ANESTHESIA

The choice of anesthetic to be employed depends on the type of patient that we have to deal with and the operation to be performed. By observing the patient, we can determine whether he is of the nervous or the normal type. Clinical observation and questioning can inform the dental surgeon whether premedication is required. Patients of the nervous and hypersensitive type should be given a mild sedative and allowed to rest before the operation. In our practice, nervous patients are given 1½ grains of pentobarbital sodium (nembutal) and allowed to rest for twenty minutes. By that time, the patient is quite relaxed and the operation can be completed without much interference. Before operations under a general anesthetic, administration of a sedative is a routine procedure.

The anesthetic to be used is also determined by the amount of infection present. When all clinical observations and x-ray pictures have been considered and the operator is still determined to eliminate the offending condition in spite of the presence of edema and inflammation, only a general anesthetic is indicated. To infiltrate into an infected area is to force suppurative matter into healthy tissue and thereby spread infection.

At times, in conditions of acute infection, especially in pericoronal infections of the third molar, when we find that it will be difficult to remove the third molar, under a general anesthetic, it is best to treat the area until the inflammation and edema have subsided, and then employ nerve block.

Nerve block and infiltration can be employed under all conditions except those that have already been mentioned. The surgeon should never operate until he is certain that there is anesthesia, whether a general or local anesthetic has been administered.

SURGICAL PROCEDURE

It is good practice, when the patient gives a history of persistent bleeding after operation, to make bleeding and coagulation tests. This is easily accomplished and may save the operator many hours of toil. These tests indicate to the dentist the number of teeth that can be removed or the extent of the surgical operation that can be performed without danger of extensive hemorrhage. If the bleeding or coagulation time is abnormal, the patient should be premedicated before a surgical procedure.

All the necessary precautions having been taken, the success of oral surgical measures depends on the surgeon's knowledge of anatomy, the technic that will be employed and his use of the armamentarium at hand. The attitude of the operator should be one of confidence and ease, impressing the patient with the fact that he possesses the ability and knowledge that this type of operation requires. During an operation, patients are always under constraint, which can be alleviated by a display of confidence by the operator.

The removal of naturally formed teeth does not present the problems encountered when fractured teeth, roots with exostosed apices or embedded teeth have to be removed. The surgical technic in these cases should be well planned before any attempt is made to remove these teeth. In this, the x-ray pictures and the clinical observations have already assisted the surgeon.

In the surgical removal of teeth, the

incision should be made far enough away from the area in which one operates that, when the mucous membrane is replaced, it will rest on osseous tissue and will not drop into the socket from which the tooth has been exfoliated. This will probably necessitate a larger flap, but the end-result will be more satisfactory. Retraction of a larger flap will present a better view of the field of operation. Operations cannot be correctly performed when one is unable to see the field of operation. Most failures result from poor visibility.

The amount of osseous tissue to be removed in cases of impacted teeth depends on the amount of bone covering the tooth at its greatest width. Sufficient bone must be removed to expose more than the greatest width of the crown of the tooth. This is true in the removal of all embedded teeth, whether the sectional method is employed or the tooth is entirely removed. No attempt to remove an impacted tooth should be made until the tooth has been sufficiently exposed to allow for its exfoliation.

After the removal has been completed, the process should be trimmed of all sharp edges. The area should then be cleansed of all remaining spiculi and washed with a warm saline solution. Since the introduction of sulfonamide, it is a good practice to insert sulfathiazole powder in the area and pack lightly with gauze.

The flap should then be replaced. If the incision has been properly made, the flap should return to its former position and adhere to the osseous tissue. A suture is required when one feels that the area may be disturbed. A drain should be inserted so that drainage may be established should there be any remaining infection.

POSTOPERATIVE CARE

It is in the postoperative period that the dental surgeon will sometimes encounter the greatest difficulty. Despite all the necessary precautions having been taken, conditions may arise which at times require his utmost attention. These may be in the form of pain, swelling, hemorrhage and infection. Conditions should be treated as they are encountered, and the dental surgeon should be equipped with a knowledge of these treatments.

Often, we hear of patients complaining of pain following tooth removal. Many of them are told to expect such pain and to bear it as well as possible. The condition can be remedied materially by administering an analgesic such as a salicylate or a barbiturate before the operation and postoperatively.

After long and severe operations, the patient should be instructed as to home treatment. Ice packs should be prescribed for the first twenty-four hours, as well as medicinal treatment. The interest in the case should not terminate here. The patient should be instructed to return to the office for postoperative observation. A telephone call the next day inquiring as to the patient's condition is good practice, and should the patient be unable to come to the office, a house call should be made.

The patient must be informed of the gravity of operations in and about the mouth. Oral surgery requires the same training, keen knowledge of anatomy, asepsis and surgical technic that are necessary in general surgery. The responsibilities are the same and sometimes greater. The removal of teeth is a serious matter and should be given the proper surgical consideration.

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ANATOMIC AND NON-ANATOMIC TEETH

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THE selection and positioning of the posterior teeth in complete denture construction is an important consideration. The anterior teeth are primarily used for incision of food, but it is the functioning of the posterior teeth which spells success or failure of the complete denture. Sentiment, emotionalism and high pressure advertising may have been the determining factors in the past in the dentists' choice of posterior denture teeth. I shall demonstrate the types of posterior tooth that most efficiently meet the functional movements of the mandible.

The act of mastication can be divided into the incision of food, the actual chewing of food and the swallowing of food. The anterior teeth are utilized only in the incision of food, the posterior teeth are used for chewing, and neither anterior or posterior teeth are directly concerned with swallowing. Study of mandibular movement leads to the conclusion that the most important part of the masticatory cycle is the actual chewing stroke.[1] To study this mandibular movement in detail, a specially designed facebow was constructed which would make graphic tracings showing the direction and extent of movement in three dimensions at the right and left condyles and the incisor point. These movements at the incisor point were further checked by means of stroboscopic photography. Many interesting and original data were disclosed by this investigation.

It was found that a chewing stroke can be divided into a glide and an actual stroke of mastication. The glide, or mandibular movement determined by the condyle and cusps and the overbite of the anterior teeth, demonstrates the individual properties of the components of mastication as lateral, protrusive and opening movements. The masticatory stroke was found to be a fusion of only the lateral and opening components, with a loss of their individual properties. There were no indications of a spherical movement of the mandible.

The importance of centric relation was demonstrated, and the gothic arch was found to be the most scientific means for its establishment. It was further shown, in this study, that the actual strokes of mastication were not within the confines of the included angle of the gothic arch, but were definitely posterior to the apex. Figures 1 and 2 demonstrate this fact by means of a graphic tracing, and Figures 3 and 4 by means of stroboscopic photography in the horizontal plane at the incisor point.

Rigidity and the use of an incisal guide-pin to maintain the accepted vertical opening should be the two main requisites of any articulator. An articulator that was presented to me by Dr. Dayton D. Campbell, and called a dimensional antagonizer, meets all these needs. (Fig. 5.) It is essentially a rigid barn-door hinge, prepared with an incisal guide-pin to maintain the vertical dimension. The casts were luted to the articulator in centric relation without the use of a facebow. For this step, use of the facebow can be considered an irrational procedure, because, with the facebow, the opening component is given precedence over the entire stroke of mastication. We found with others that, with the slightest amount of opening, that is, the depth of the cusps, the condyle moved downward and forward on

the condylar path. This eliminates the condyle head as the center of the opening axis. Again, it should be emphasized that we should not be interested in any one component of mastication, but should be essentially concerned with the actual stroke of mastication.

The anterior teeth are selected and set up to follow the rules of esthetics which meet the individual patient's requirements. Then the operator must decide what type of posterior teeth can be used most effectively. It is well known that opinion on this question is divided into two schools of thought, made up of (1) proponents of the anatomic tooth and (2) those who utilize and support the use of the non-anatomic tooth. Every one

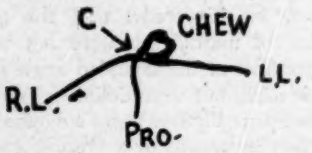

Fig. 1.—Graphic tracing made on horizontal plane at incisal point, demonstrating that chewing stroke is not within confines of gothic arch.

Fig. 2.—Graphic tracing made on horizontal plane at incisal point, showing difference between masticatory stroke and components of mastication.

is acquainted with the salient points of these two schools, which may be briefly summarized as follows: The anatomic tooth (a) looks like a natural tooth; (b) meets all required needs for balance, and can be easily synchronized with mandibular movement; (c) is efficient, and (d) prevents the mandible from drifting forward. The non-anatomic tooth (a) can be easily set up to balance and be synchronized with mandibular movements; (b) is very efficient because of its non-anatomic feature, and (c) will conserve the ridges.

The theory of proponents of each design can be followed in numerous articles that have appeared recently in dental publications, such as those written by Hall,[2] Helm,[3] La Due,[4] Sears,[5] Thompson[6] and Wheeler.[7] My thesis, however, is to correlate known facts about mandibular movement with the type of posterior tooth that is best suited for complete denture work.

The mandible, when at rest, is held in the physiologic rest position by the muscles of mastication. The masticatory, or chewing, stroke starts at physiologic rest position and goes downward and then laterally upward to centric relation. (Fig. 6.) Centric relation is essential for a proper relationship of either anatomic or non-anatomic teeth, for it is in this

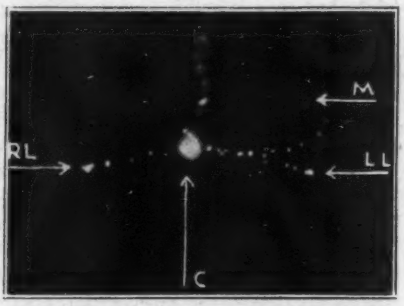

Fig. 3.—Stroboscopic picture showing differences between chewing and glide (taken on horizontal plane at incisal point). c, centric position; m, chewing stroke; rl, right lateral stroke; ll, left lateral stroke.

position that they function in mastication. Centric relation is related to the amount of vertical opening decided upon by the operator, and its location changes when the vertical opening changes. Stansbery[8] recognized this phenomenon when he demonstrated that if the vertical opening was changed, differently located gothic arches would be traced on the same horizontal plane at the incisor point. The incisor point of the mandible moves upward and forward when the interalveolar distance or vertical dimension is reduced, and downward and

backward when the vertical dimension is increased.

Centric occlusion of the teeth is lost when there is a loss in vertical dimension, through atrophy of the alveolar ridge. The mandible, as explained above, moves upward and forward. If cusped anatomic teeth were used, the mandibular bicuspids and molars would then strike forward on the inclined planes of the opposing maxillary teeth, rather than at the marginal ridges, an anterior movement of the upper denture and a posterior movement of the lower denture resulting. (Fig. 7.) This unquestionably causes a further traumatic resorption of the ridges, and is the basis for establishing a vicious cycle of ridge resorption followed by malocclusion, etc. However, the occlusion would not be seriously affected if non-anatomic cuspless teeth were used under the same conditions. The mandible would have a new centric relation in an anterior position, but because there would be no interdigitation of cusps, there would be no resultant forces in either an anterior or a posterior direction. (Fig. 8.)

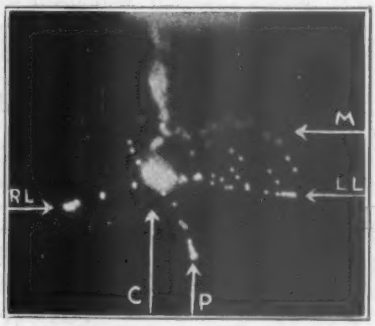

Fig. 4.—Stroboscopic picture taken on horizontal plane at incisal point, depicting multiple chewing strokes compared with components of mastication. The protrusive component is not used in a chewing stroke. c, centric position; m, chewing stroke; rl, right lateral stroke; ll, left lateral stroke; p, protrusive relation.

That "cusped anatomic teeth will prevent the mandible from drifting forward" is the most unscientific statement ever made to the profession. It is futile to hope that the addition of cusps will stop an anterior drift of the mandible, when the only time that the teeth come in contact is during actual mastication of food—approximately one hour of the twenty-four. The remainder of the time, the mandible is held in the physiologic rest position,[9] a position which is constant, irrespective of the vertical height incorporated into registration of centric relation, or whether vertical dimension has been lost or any teeth are present. We may find that, when non-anatomic posterior teeth are used, if the dentures do not maintain the correct vertical position as explained above, the mandibular denture is occluding in centric position anteriorly from the maxillary teeth. If anatomic teeth were used, the interdigitation of the cusps would remain after they slide into centric position, but the entire denture base may move

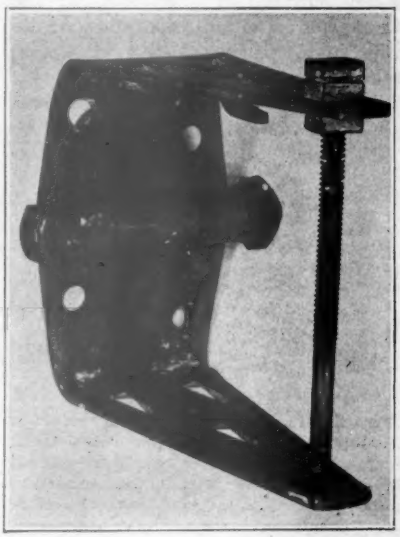

Fig. 5.—Barn-door hinge with incisal guide pin, which meets all requisites of an articulator.

off the alveolar ridge, in addition to traumatizing it, thus presenting the appearance to the unobserving that the dentures were keeping the mandible from drifting forward.

The cusps of anatomic teeth, when set to occlusion on an adjustable articulator, are interdigitated in accordance with the mandibular glide. The condylar paths, Bennett movement and incisal guidance were, of necessity, set by the components of mastication rather than the masticatory stroke. Therefore, the cusps will occlude and function primarily on the "envelop of movement" of the components or within the confines of the gothic arch, rather than on the actual stroke of mastication. This set-up, with its fine degree of balance on the articulator, is not indicative of function in the

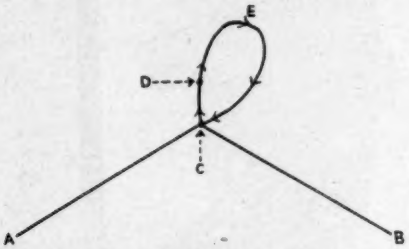

Fig. 6.—Tracing on horizontal plane at incisal point, depicting chewing stroke DEC, which starts at D, physiologic rest position, then goes downward, laterally and upward to centric position (C). ABC, gothic arch or lateral components of mandibular movement.

mouth. It was found[1] that, because of the versatility of the temporomandibular joint and of the muscles of mastication, although the mandible can move in a glide, under the direction of the dentist, it does not normally do so when actually functioning in a chewing movement. Furthermore, the chewing stroke is not within the confines of the included angle of the gothic arch in the horizontal plane at the incisor point, but is exerted posteriorly from its apex. Although the chewing movement may be continuous with the glide for a very short distance toward centric relation, its direction into centric relation is entirely different. Hildebrand[10] found that the longest glide between the maxillary and the mandibular teeth averaged between 1 and 2 mm. at the incisor point irrespective of cusped or abraded dentition. Therefore, when the patient is wearing dentures with either anatomic or non-anatomic teeth, the gliding during mastication will be over a very minute area, directed primarily by the musculature rather than by the teeth. It is extremely unscientific in view of the foregoing facts to pay more attention to the components of mastication than to their fusion into a chewing stroke, which is of prime importance.

The use of cuspless non-anatomic teeth would definitely obviate the foregoing consideration. It certainly entails less effort to set the teeth to a scientifically correct centric relation on a rigid plain-line articulator than to the condylar paths of an adjustable articulator and then set the anatomic teeth to a theoretical balance as shown by the articulator. When anatomic cusped teeth are used, we have the following algebraic formula of which cognizance must be taken: Consider the use of cusped teeth as figures of three dimensions or the length $\times$ width $\times$ height of cusp $=$ y (or labor expended in setting up anatomic teeth) or $1 \times 2 \times 3 = 6$. If the height of the cusps is eliminated, we have length $\times$ width of cusp $=$ y (or labor expended in setting up the teeth) or $1 \times 2 = 2$ or a simplification of our occlusal problem by two-thirds.

"With cuspless occlusal surfaces, balance is an impossibility except in the hypothetical case in which condyle paths follow and occlusal surfaces overlay similar or concentric spherical surfaces in all of the mandibular excursions."[11] Such statements are based upon the false premise that there is a spherical movement in an actual stroke of mastication. It was found[1] that the condylar move-

ments during chewing are roughly ellipsoidal and do not follow the paths made by the glide. Even with natural teeth, the glides could not be construed as arising from a common center, as the frontal glides in a lateral movement went downward and forward. (Fig. 9.) Furthermore, as Pleasure and Friedman[12] brought out, "if the teeth followed the surface of such a sphere in function, they would gradually wear into closer and closer apposition with the sphere and not out of apposition." MacMillan[13] presented one of the best interpretations of balance in complete denture construction when he stated that it is the ridge on the opposite side of the mouth, and not the teeth, which balances the dentures. The comparatively minute glide of the mandibular teeth on the maxillary teeth prevents any extensive adjustment of balance to the dentures by means of the so-called balancing side as opposed to the working side.

Cuspless non-anatomic teeth can be further set to more closely follow the fundamental laws of physics as related to the application and dispersion of forces so that the retention of either the maxillary or the mandibular denture may be increased.[14, 15] The inclined planes on cusped anatomic teeth so complicate the occlusal problem that forces may be obtained which are disastrous.

The non-anatomic types of posterior tooth are thus unquestionably superior in

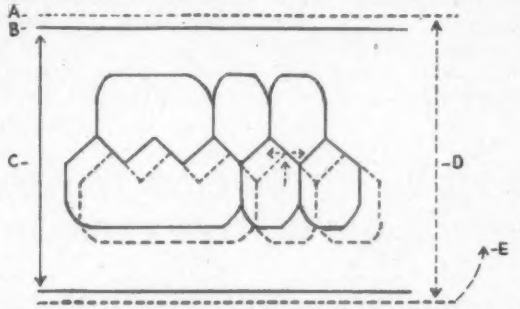

Fig. 7.—Tracing illustrating, by means of solid lines B or alveolar ridge and arrow C, original vertical opening to which anatomic teeth were set. When the vertical dimension is lost, the ridge assumes the position shown by the dotted lines A. The mandible moves in the direction of line E when the vertical dimension is decreased in centric relation, as at D. The cuspid teeth strike on the inclined planes, with dispersion of force as illustrated by arrows.

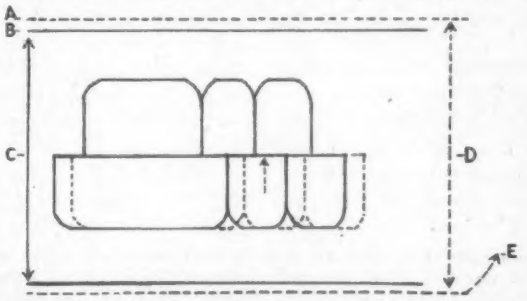

Fig. 8.—Drawing demonstrating non-anatomic occlusion by means of captions employed in Figure 7. The dotted lines show the position of the non-anatomic tooth when vertical dimension (D) is lost.

complete denture construction because they are more amenable to adaptation to mandibular movement. The alveolar ridges will not be traumatized to the extent that they would be if anatomic teeth were used, when vertical dimension is lost. The problem of occlusion is simplified by two-thirds when non-anatomic teeth are used, and retention of either denture may be increased by properly positioning the posterior occlusal plane.

sary for the use of anatomic or non-anatomic teeth.

The only necessary features of an articulator or antagonizer are rigidity and the use of an incisal guide pin.

Consideration of the salient features of both anatomic and non-anatomic teeth as related to mandibular movement and the amount of work expended in their construction leads to the conclusion that the non-anatomic tooth form is superior to the anatomic form.

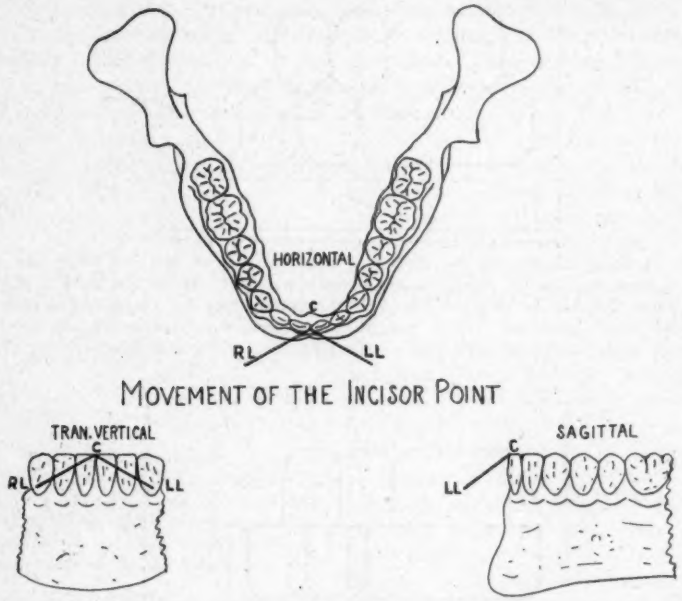

Fig. 9.—Diagrammatic view of gothic arch in three dimensions taken at the incisal point. The horizontal or top view shows the gothic arch as it is usually depicted. The transverse vertical or front view presents an entirely different aspect of this movement, as does the sagittal or side view.

SUMMARY

The operator must thoroughly understand the difference between an actual chewing stroke of mastication and a mandibular glide.

Steps in complete denture construction, such as centric relation with its two components, vertical and horizontal, and mounting on an articulator, are necessary for the use of anatomic or non-anatomic teeth.

The only necessary features of an articulator or antagonizer are rigidity and the use of an incisal guide pin.

Consideration of the salient features of both anatomic and non-anatomic teeth as related to mandibular movement and the amount of work expended in their construction leads to the conclusion that the non-anatomic tooth form is superior to the anatomic form.

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PRACTICE BUILDING IN DENTISTRY THROUGH PATIENT EDUCATION

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LIFE is an adventure. The rewards of life are to those who live it best. But sometimes we do not always know how to live it best. We must learn the ways to the rewards of life. There is no place in today's life, commercial, religious or professional, for an average man. Too many of us have relied upon the law of averages to bring us success, and too few of us have applied the law of definite aim to our lives in the effort to achieve it. The farmer depends on the law of averages year after year for sufficient rainfall for the production of an average crop. The salesman makes a certain number of calls on his prospects and expects to close an average number of sales. The professional man charges his fees on his books and expects to collect a certain percentage of them. Thus the law of averages works. But today the professional man can no longer wait for averages to operate in his particular vocation and expect to achieve outstanding success. What he needs is immediate and sustained results, which can be attained only by the principle of definite aim. The law of averages must be superseded and, in its stead, must be instituted a system of practice management, including that of patient education, which will raise this law to a superlative degree. The professional man must set definite stakes ahead, and then follow through.

While it is essential to set a goal toward which one can strive, it should ever be kept in mind that wealth, fame and position are not always an accurate measure of success. H. G. Wells has said, "The only true measure of success is the ratio between what might have been on the one hand and the thing we have made of ourselves on the other."

Read at the Annual Midwinter Meeting of the Chicago Dental Society, February 23 and 24, 1943.

Even though one may fall short of his goal, he need not feel discouraged so long as he knows that he came as close to it as his ability and the varying circumstances of life permitted.

Sometimes the instinctive urge to compare one's own accomplishments with those of others acts as a spur to greater efforts. However, such a comparison is not always fair, because all do not have like abilities and opportunities. Walter S. Gifford, of the Bell Telephone Company, says:

> Success in life is relative. Success means making the most of such ability, personality and physique as you have. Don't measure your success against others, but against your own potentialities. Never fret because some one else has done better. If you become imbued with this philosophy of life and sincerely try to do the best you can, and achieve the sincere feeling that you are doing the best you are capable of, you have attained as much as any man can attain. More than that, on that basis, you will go as far as you can go.

The average professional man has been too prone to accept such practice as has drifted his way without doing much of anything to attract it. If he is blessed with an insistent demand for his services, he is adjudged successful and lucky. With an average dental income for the United States of only $2,914, according to the latest available figures, it is evident that entirely too many dentists have depended on the law of averages to bring them success. A few, however, having established system and order and definite objectives in their practices, stand out as stalwart examples of what can be done.

PRINCIPLES TO FOLLOW

What are some of these principles of practice management that assure outstanding success?

The first principle is the setting up of an objective in both life and professional practice. Without such an objective or target, one will drift, and waste his limited energies, depending on luck rather than concentrating upon definite objectives.

But sometimes the achievement of these objectives is not easy of attainment. Perhaps we have not attained the success of which we had dreamed. Possibly we have not had the large clientele that we wished for and our fees have been low and hard to collect. In short, but unrecognized, our problem has been fundamentally our inability to sell ourselves and our services profitably to the public. Is not this fault partly, or even largely, one's own? Stop and think: Are we as enthusiastic about the profession of dentistry as we were when we first entered practice? Are we enthusiastic about telling the story of dentistry? Do we make a conscientious effort to present our most pleasing and attractive personality to all people whom we meet? Do we honestly analyze our own failures and faults and use them as stepping stones toward success? Success does not just happen. It is only brought about by hard work, systematic planning and a complete follow through to the goal.

In college, we were taught well the "art of dentistry," but not the "art of practicing dentistry," or the "psychology of attracting patients and educating them on the values of dentistry." One was graded on his I. Q., but his P. Q., or personality quotient, which is of far greater importance in the achievement of business and professional success, was entirely ignored. It matters not how good an operator one is, or how much one knows about the "art of dentistry," if he cannot through his personality and by other ethical means attract people to his office and then "sell" them all of the dental service they honestly need, he is going to fail.

People do not come into the dental office to buy dental work: they come in to get relief from some ache or pain. They want to get out as quickly as possible and as cheaply as possible. They

hope that we will not find much the matter with their teeth, and so, when we do, it is up to us to honestly apprise the patient of his condition and lay before him plans for its control and the restoration of comfort and efficiency. Since the patient does not want to spend more than he has to on dental care, it is our duty to educate him as to the irreplaceability of his own teeth and the advantages of dental health. This is not so simple as just telling him what he needs, and quoting a price. We must actually understand pedagogic procedures and practical psychology and use them adroitly in educating him and bringing about a desire on his part for adequate care.

One's objectives in life may be materially or completely altered through ignorance of the principles of educating the patient and selling one's services. Those who have achieved success had to learn these principles in the hard school of experience, because they were not taught in any dental college.

The second principle, after setting up an objective in life and practice, involves the establishment of system and order within a practice. This implies a simple, complete and accurate set of records. It also implies definite plans for profit and savings to attain these objectives. One must also include a plan for the amortization of his education and equipment costs, which are the professional man's capital investment. One's capital investment, whether it be in the commercial or in the professional world, must be in such form as to assure a constant turnover. The average dentist's capital investment is from $11,000 to $17,000. This is quite a sizable sum of money, and, if amortized over the most fruitful years of active practice and reinvested in income-producing form, it will become a substantial foundation for the erection of his edifice of competency for retirement.

The third principle for success involves methods of salesmanship or patient education. It is a fallacy to think of this procedure as unethical in dentistry. If we substitute the phrase "dental education" or "patient education" for the term salesmanship, we shall have my interpretation and more exact meaning of the use of this term in this discussion. Thus, with this understanding and qualification of the term salesmanship, its use in dentistry is entirely justified and ethical. Salesmanship is just as essential for achieving success in the professional world as it is in the business world. It has two dominant factors, personality and psychology. Many professional men are inclined to assume that personality is fixed or inherited, failing to recognize that personality can be directed toward a specific purpose, just as a muscle in the body can be developed and strengthened by exercise. Psychology deals with the hidden power behind personality that influences people to think and act as we wish them to without their realizing the application of such power.

Sales do not just happen: they are always planned. An architect always draws a set of plans for the structure that he proposes to build. These plans always start with an ideal in mind, just as the building itself must always start with a foundation. If we tell our story interestingly, the prospect will listen to it and fit himself into the picture that we are drawing. He will react positively to our story. If it has been convincing, he will react affirmatively; if it has not been convincing, he will react negatively. Usually, patients turn down a proposal because the dentist has failed to tell a logical and convincing story. Patient education is the most vital factor in building a successful dental practice and it cannot be overemphasized or eliminated therefrom. On the contrary, the lack of adequate patient education regarding the value of dentistry and its rôle in the prevention of oral diseases,

and the relationship of oral disease to general health is the basis of many a mediocre and small income practice and ultimate failure.

The salesman who does not repeat his story again and again to each new prospect, and who does not display enthusiasm and carry conviction in doing so, never closes a sale. In almost every instance, the dentist fails to educate his patient to accept his recommendations because he does not know how to tell his story. He does not know how to convey in simple non-technical language the true picture of his patient's oral condition and his needs. Many dentists are failures not so much because they do not possess the ability to tell an interesting story about dentistry, but because they fail to understand its importance and place in patient education and its bearing upon their success in practice.

It is essential that the dentist use sound pedagogic methods in the presentation of his plans to his patient. This can be done by developing in simple language a story augmented by roentgenograms, photographs and models of similar cases so that the patient can grasp the picture being painted of his needs for complete mouth rehabilitation. He must be educated to understand the cause and effect of such conditions as caries, loss of teeth, malocclusion, pyorrheic syndromes and infection in their relationship to his general health. There has been nothing in undergraduate training of a dentist along pedagogic lines to qualify him to undertake this educative task. That is the root of the problem of ineffective patient education. Dentists cannot be expected to educate their patients effectively until they themselves have acquired some basic training vital to the effective presentation of this subject.

Patient education requires not only the function and ability of a teacher, but also a psychologist's deeper understanding of human nature. A dentist may be able to make a logical or oratorical presentation of his plans to the patient, yet fail completely to correlate effective patient education and a simple understanding of human wants, emotions and reactions with his diagnosis and the consummation of a satisfactory "sale" of his services to fulfil these fundamental wants. In other words, he fails to convince the patient that he needs a complete mouth rehabilitation instead of merely the repair of the single condition that brought him to the office.

It is the object of patient education to:

1. Acquaint the patient with the essential facts of modern dentistry.

2. Acquaint the patient with the cause and effects of dental disease.

3. Acquaint the patient with the advantages of preventive dentistry through regular treatment and reexaminations. Regular reexamination can be best accomplished through a patient recall system.

4. Induce the patient to subscribe to complete mouth rehabilitation, when indicated.

5. Educate the patient to assume his share of responsibility in maintaining optimum dental health.

6. Educate the patient to keep his appointments promptly, and to notify the secretary when this is impossible, so that the time may be filled and not lost in income production.

7. Educate the patient to pay his bills promptly as agreed.

The failure of the dentist in these phases of practice management can be summed up specifically as a fundamental inability to organize his educational material and present his story simply and logically step by step so that the patient understands clearly and accepts each step as he goes along. As a result of this shortcoming, the dentist loses the patient at some point during the educational process, but is generally not aware of this fact until the patient rejects his propos-

als. It is important that the dentist shall understand symptoms of reaction in the patient's mind, both favorable and unfavorable, and be able to change his story accordingly. He must be able to keep his prospect's mind in the channel that he wishes it to follow.

It is true that one cannot be 100 per cent successful in every educational effort, but when he finds that only a small percentage of his potential patients accept his recommendations for complete mouth rehabilitation, he had better stop and check on his methods, and change his *modus operandi*. Furthermore, when he finds that he has a low percentage of patients returning regularly for reexamination, following his recommendations for prevention of future dental trouble or recommending his services to others, he should look for a decided weakness in his practice management methods. These weaknesses are directly traceable to the fact that the dentist himself fails to tell a vital, enthusiastic and convincing story about dentistry.

Entirely too many dentists feel that, because they know well the "art of dentistry," the public should accept their judgment unequivocally and without further education. They may even feel that it is not necessary for patients to know the cause and effect of dental diseases, or even all of the conditions disclosed by a thorough dental examination, and they sometimes resent the questions of their patients. Some dentists even feel that it challenges their knowledge and authority and puts them on the defensive, and may even show their ignorance of advances in professional practice. Confidence is essential to a successful relationship between two parties, and when one shows reluctance in a friendly and sympathetic approach to the problems of the other, lack of confidence is immediately felt and the relationship is terminated as soon as possible. On the other hand, many dentists feel that the time involved in the education of patients is lost, or at best, is low-income producing. When diagnosing and prescribing, they are still thinking in terms of immediate corrections rather than long-range prevention of dental diseases.

Education is the greatest force on earth. Think of the many things that it has accomplished! To cite but a single example, consider the word "vitamin." Only a few years ago, "vitamin" was an enigma even to the professional man, yet today, through the force and power of education, the public has become familiar with vitamin products and are able to discuss them fairly intelligently with physicians and dentists.

I am convinced likewise that a concentrated educational program sponsored by the organized dental societies, telling the public of the benefits of dentistry, could, within a few months or even weeks, convert the American people to the ideals of preventive dentistry. But until the organized dental societies undertake such a broad program of education, it is the duty of the individual dentist to perform the task in his own office. From a purely selfish viewpoint, the dentist is reluctant to turn from a remunerative practice of corrective dentistry to that of the long-range program of prevention with its present inadequate, uncertain and questioned fees. However, many of the most successful practitioners of dentistry are those men who have become teachers and apostles of patient education. They look upon the time spent in this manner as part of their sales effort, and such it is. And it has paid them well. Many men have climbed higher on the ladder of success by watching and emulating the practices of those ahead of them. Nothing, it is said, succeeds like success.

There are only three steps in an educational presentation: (1) the opening, (2) the body and (3) the closing. There are, however, innumerable things that go into the completion of the presentation,

and most of them come from and through the personality of the dentist and his ability to educate his patient to the point of accepting his recommendations.

In dental practice, the educational process has been initiated. The patient came to the office of his own free will with a definite need of some sort. He seeks relief from an ache or pain, the repair of a carious tooth or the replacement of missing teeth. In this case, the dentist does not have to formulate a story to attract attention and create interest, for the patient's immediate trouble has already done that. After taking care of the emergency, a complete dental examination is in order. While making this examination, we must start our story about dentistry, taking our clue from the trouble that brought the patient to the office, or from a question asked. There is no set formula for patient education. Each patient is an individual, different from all others in temperament, mental and physical traits and social status. The methods of handling the patient will be determined by these facts. The premise, therefore, is that the dentist is capable, to some extent at least, of classifying his patients. This then brings us face to face with the technic of the process of patient education.

FACTORS IN PATIENT EDUCATION

The personality of the dentist creates the first impressions, either favorable or otherwise, sets the stage and initiates the ensuing discussion. This kind of personality may be defined as "a development of those positive traits of character that attract and please people, that build confidence in themselves and their services and reflect a genuine interest in the other person's needs and wants, bringing them together for their mutual profit.

Success in dental practice largely depends on "getting the most out of ourselves for the other person." That, in brief, is the true and ultimate purpose of dental patient education and dental practice.

It is well to understand that dental "sales" are not always made by appealing to logic or reason, but more often by playing upon emotions. Psychology teaches us that emotions rule and control our lives. A dentist, understanding this fact, takes advantage of it. Nor is it inconsistent with ethics to do this. These emotional factors are many and of different value to different individuals. In the past, the dental profession has honestly attempted to build up in the minds of the public a realization of the importance of the dental apparatus and its relationship to general health. They seemingly and persistently ignore the greatest motivating force at their command—human emotions—and it is these motivating forces that rule their lives and unconsciously guide them along the pathway of their destinies. The individual dentist, whatever his position in life, finds that his success is measured, if not entirely controlled, by his ability to project himself, and his services, into the lives of those about him. He must sell himself and his ideas, education, knowledge and experience to those whom he wishes to influence, if he is to achieve success in his profession.

STEPS IN THE DEVELOPMENT OF SKILL IN PATIENT EDUCATION

There are three essential steps in the development of skill in patient education.

1. Knowledge of your profession.
2. The ability to organize this knowledge advantageously for the most effective and impressive presentation to the patient.
3. The knowledge of and the practical use of psychology to influence a prospective patient and bend his will to ours.

Let us amplify these steps.

1. Know your profession. It should be the object of dental education, both undergraduate and graduate, aside from

teaching the technic of dentistry, to prepare the student to adapt himself to the changing social and economic conditions which he will encounter in the active practice of his profession. To be sure, new methods are being taught and new subjects are added from time to time, but essentially the curriculum of dentistry has remained unchanged for many decades. There has been no material change or attempted adaptation to the radical changes that have taken place in all our lives within even the past few years.

It is true that no one can foretell the future, but they can observe trends, which, of course, alter the future course of life. Whenever a trend appears on the horizon of a business, modification or elimination of some of the practices of that business must be made in order to conform with these trends, which are, in short and fundamentally, merely changes in the direction of flow of human behavior into new channels. The business world is quick to observe these trends and change its *modus operandi* accordingly. Professional men seemingly try to ignore such changes and continue to follow traditional and outmoded practices, to their own detriment. However, more and more practitioners are adjusting their practices to the new economic and social life of their patients, casting aside impediments of tradition. The dentist today must do this if he is to survive in this extremely competitive socio-economic structure. Great changes in the professions are in the offing and we must be prepared to accept some of them whether we like them or not. Prejudices must be laid aside. Social revolution is abroad throughout the world, and it is bound to influence the dental profession at many points. This will call for some radical changes in the concepts of training, as well as in the practice of dentistry, if it is to continue to fulfil its purpose in relationship to human needs. It is essential for the dentist today to know more than the technics of dentistry. Since he must compete with all business and commercial enterprises that use modern selling devices and methods of advertising to lure the public into their establishment and sell them their wares, he must know their sales methods and have a few of his own. The ethics of our profession denies us the use of methods and devices of the business world, but does not deny us the use of sound business principles in the conduct of our practices. Therefore, included in the phrase "know your profession" must also be knowledge of business principles and ethical methods of attracting patients to our offices and educating them as to the importance of dentistry to their lives.

2. Organization of educative material. A prerequisite to the organization of one's educative material is a definite knowledge of the needs of the patient. In dentistry, the organization of this material is based upon the facts disclosed by a complete and thorough diagnostic examination. Even though the examination is the basis of and the means by which a patient's needs are disclosed, it does not necessarily coincide with the wants of the patient. The dentist must, therefore, use pedagogic principles in presenting his suggestions and recommendations for the specific fulfilment of these needs through the "sale" of his services. Very often, the patient is not aware of the seriousness or the extent of his trouble, and it is the duty of the dentist, after making a thorough examination, to disclose the results of his findings to the patient. Informing the patient of his needs does not necessarily lead to a request for dental service, for often an indefinite and vague need must be converted through education into an imperative necessity. Each patient is a problem in research and should be studied individually as such. Informing the patient of the results of the examination is a professional act. The methods used

for the conversion of the examination into definite action to control and correct the condition is specifically a business procedure and an act of salesmanship.

The third factor in the development of skill in patient education is the knowledge and the expert use of practical psychology to influence a prospective patient and bend his will to ours; in other words, to educate the patient in dentistry and its values in human comfort and health to the point where he will accept our recommendations and agree to employ us as his dentist.

In order to do this, we must present the results of our examination to the patient in a logically and systematically prepared plan based upon his specific needs. We must utilize the devices of ethical salesmanship in converting the patient's more or less superficial desire or need into a definite want and necessity. At this point, we must lay aside our professional toga, so to speak, and assume the rôle of businessman and salesman. Our sole object, bearing in mind the need of the dentist, is to present our recommendations to him in such manner that he will subscribe to our ideas.

The proposed plans of service to a patient are best presented at a special appointment for this purpose, after we have had an opportunity for studying the case and outlining our plans. The assistant is told not to disturb the dentist while he is making his presentation. It is important that the dentist go completely through his plans with the patient and not allow his mind to be distracted during the procedure. A slight interruption will upset the patient and lead him to postpone a decision in the matter, and a postponement, in the majority of cases, leads to permanent loss of the patient.

In presenting our plans and recommendations to the patient, models, roentgenograms, photographs and actual samples of similar cases, if possible, are employed. In simple non-technical language that the patient can understand, our picture is painted in the light of benefits to him. We should talk in the "you and your needs" language, not going into the mechanics of your work. A patient does not understand the intricate technic of dentistry and its introduction only serves to confuse him. Likewise, we should not talk of materials, for to do so puts a comparative and tangible value upon them, out of all proportion to their intrinsic worth. The average patient is interested in but two major things: first, appearances and comfort; (2) cost. We have already ascertained what this patient needs most to satisfy his first desire, and we are going to stress this need and appeal to his emotions as much as possible and belittle the cost in accomplishing this purpose.

The alert dentist is always prepared to present an alternative plan of procedure and estimates of cost when he senses that the prospect is apprehensive about the plan being presented. He must be intuitive, sensing this apprehension, and quickly change his approach by offering the alternative plan, never letting his prospect get out of hand. He must never be caught unprepared for any eventuality. The presentation must answer all questions before they can be asked. A compromise plan is sometimes essential in consummating one's purpose, and one should not feel that it is any reflection upon his professional judgment when the patient chooses the compromise plan. Every patient knows his own circumstances best and reserves the right to final decision. A dentist true to the ideals of his profession will recommend only plans of reconstruction to his patients that uphold these ideals. Some dentists, but not all, feel that only the highest priced dental work is best, misinterpreting high price for highest quality. This is not true, and price alone should not determine the standard of

quality of services to be rendered. When a patient is given the opportunity of making the final decision in the matter, it will be found that the relationship in all its phases will be upon a more satisfactory basis. On the other hand, if the dentist persists in overriding his patient's wishes and in doing things his own way, the relationship will be open to complaints and dissatisfaction.

A dentist should understand the psychology of presenting his services in such manner that his patients seem to decide of their own volition, rather than from the use of high pressure sales methods, which in dentistry are strictly taboo. If we sell our services on this basis, we will build a clientèle that will recommend us to their friends. Furthermore, this type of patient will give us little collection trouble. If our patient can go home, after a visit to our office, and say to her husband, "At last I found a dentist who knows exactly what I want. He showed me today how I can have this ugly gold bridge in the front of my mouth replaced by a 'porcelain creation' that will look like my own teeth." The dentist "sold" her on the idea of another bridge, but this time he was wise enough to call it not a bridge, but a "porcelain creation," and to know also that this patient wanted, above all else, the satisfaction of a better appearance, and this was the basis on which the sale was actually made. Cost was a minor consideration.

Another vital point of patient education to be considered is that the relationship to be satisfactory must have advantages to both parties. Both must profit by the transaction. It is true, pressure is necessary and always will be an indispensable element in closing a sale whether in selling an automobile or in selling dental services. But it must be the right kind of pressure. High pressure, in the vernacular and common use of the phrase, means some sort of external pressure. This implies that force is necessary and also that it must be applied to the prospect from without. A salesman using high pressure exhorts, cajoles, bullies, urges, intimidates, threatens, shames and otherwise tries to force his prospect into action. The effort to do this is tremendous and the waste excessive, for the percentage for this type of sale is very low. Furthermore, dental ethics does not condone such procedures.

The old adage, "You can lead a horse to water, but you can't make him drink" is a truism that must be modified to be of value to a salesman. It is never the salesman's job to make the horse drink, but it is his job to make him thirsty so he will want to drink. With this psychologic change in mind and attitude, the closing of a sale becomes a matter of creating in the prospect's mind a hunger or thirst for our proposition, and when this hunger or thirst becomes acute enough, he will act of his volition to satisfy the pang and acceptance of our recommendations will logically follow. The whole theory of patient education is based upon this simple thesis and approach to a successful closing of a sale for dental services.

To briefly amplify the logic of this formula, one must understand that the closing of any sale, for either professional services or durable goods, is not the result of any one particular thing that is done or one particular magic word that is said. Rather, it is the result of a series of premeditated and planned steps leading toward a definite purpose of creating internal pressure to satisfy a definite want, desire, hunger or thirst in a prospect.

Want, desire, hunger and thirst are elementary examples of pressure forces within people that cause action. Fear, hate, greed, ambition, pride and love are further examples of human emotions that create internal pressures. The stimulation of these emotions is the heat that is necessary to raise the pressure to the point of action.

Everybody has within his makeup certain normal desires, wants and needs, problems of hunger and thirst, that, when intelligently aroused by education, will develop tremendous internal pressures. And observe this pertinent fact: internal pressure is something that most people do not willingly suppress, but attempt to relieve if possible. This is the force behind the human nature trait of trying to keep up with or surpass the Joneses. Thus, when one makes use of internal pressure instead of the usual high pressure, he is enlisting the most powerful force of human nature and emotions as an ally in helping him consummate his purposes. This is the modern way of pressure selling. It is also modern psychologic selling. It is selling through education. It is obvious, therefore, that the higher one can raise this internal pressure within a prospect, the more surely will the prospect subscribe to his proposition.

Since the emotions are the psychologic point on which to exert pressure, a brief discussion of some of these factors may be in order. The first is appearance, because it supersedes all others of a patient's wants except the relief of pain. Women alone are spending three-quarters of a billion dollars annually for appearance's sake on such items as cosmetics, hair-waves, beauty treatments, perfume and fingernail polish. Such other items as sheer hosiery, hats, foundation garments and costume jewelry make up another three-quarters of a billion dollars. The total dental health bill for the United States is less than one-half of either of these totals, a paltry $340,000,000 divided among 65,000 practitioners. It seems that people will sacrifice health for appearance. We should take a leaf from the success book of the business world and "play up" what dentistry can do for hollow cheeks, sagging chins and deep age lines about the mouth and nose. Let us show a few "before and after" photographs of some of our patients who have had modern dental restorations. Since the ear perceives only 15 per cent of facts while the eye perceives 85 per cent of them, we should take advantage of this phenomenon and show models, photographs and actual samples whenever possible in educating our patients on the value of dentistry. However, let us not make the mistake of talking about materials, or calling our restorations plates and bridge work.

Patients dread the time when they must lose their natural teeth and have them replaced with artificial substitutes, and it will lessen the shock to their already distraught and upset minds if we call them "denture restorations" or "porcelain restorations." Good phrases to use are "gold as a medium of restoration," "silver as a medium of restoration" or "porcelain as a medium of restoration." Women no longer patronize the barber for hair-cuts and finger-waves. Now they go to the hair stylist, who creates an individual style for each lady to fit her personality. That is using practical psychology. Hairdressers know that it pays them well to "play up" a woman's ego and make her feel important. They give her individual attention and cater to her foibles. And how she likes it! Even though dentists in the early days were barber-surgeons, they have, during recent decades, developed scientifically and technically second only to medicine, except in practice management and the use of practical psychology. In these respects, we can claim no great improvement. But consider what we can do for a person's appearance! Every day, we see caries and irregularities of alinement of teeth that are deformative, but do we play upon the patient's pride, vanity and egotism in an attempt to educate them to the values and advantages of modern dentistry to hide such defects? Most of us do not, but, if we must do so, is it any reflection upon our prestige as professional men? We certainly are offering

our patients the highest type of dental service which the profession has developed, and of this we are proud.

The late Glenn Frank is quoted as saying, "This is a very busy world we are living in. Even excellence must fight for attention. The world is sure to be waylaid by a good salesman long before it reaches your cabin in the woods. The regrettable fact is that we dare not do good work and let it go at that. Miracles do not happen even for the right. You must know how to sell as well as how to create." "Let the dental profession," says Stanley C. Brown, "through all its influences united begin now to sell itself to the public." Let us throw out some of our outmoded ideas and traditions and change our *modus operandi* to fit the life and competition of the present day.

The second elemental human want is for comfort, security and property. This means personal comfort and security of living and an income sufficient to indulge in at least a modicum of today's luxuries and pleasures. It is human nature for man to want the security of a home and a competency for his old age, but it is also a trait of human nature for him to try to outshine his neighbors in the display of more and finer things, and he will sacrifice future security for immediate possessions and pleasures. He will even sacrifice health to acquire these things. As dentists, we must recognize these foibles of human nature and try to create a desire for health, comfort and security stronger than the desire for the luxuries of life, which are of no value without good health with which to enjoy them. What dentistry offers in the way of health preservation and restoration, appearance, comfort and security of mind and body should be considered among the most desirable and priceless things of life. Is it not worth more of our time and effort to educate the public as to these vital facts regarding dentistry?

The third element of basic human want is esteem. Esteem gives a feeling of self-confidence, superiority and appreciation. It satisfies that internal pressure emotion of pride and vanity. Again, as dentists, we have it within our power to enhance the personality appeal of our patients, and thus improve their social position in the community. We must render dental service that will increase this self-esteem and eliminate the inferiority complex.

The fourth element is happiness and pleasure. Since the creation of the world, man has been in search of happiness and pleasure. The happiness they seek, however, is often marred by ill-health or a handicap in appearance. Not all persons are created beautiful. Some inherit handicaps in appearance that may be greatly improved by dental treatment. Again, as dentists, we have in many instances the solution to such problems, and with a proper psychologic approach to it, we may bring about happiness and pleasure to a discouraged and worried person and change the entire course of his life for the better.

Let us overhaul our procedures and armamentarium and put more romance into our work by proper and efficient patient education, appealing more to these basic human and psychologic wants: personal appearance, comfort and security, self-esteem, happiness and pleasure. Then we will attract a greater number of patients to our offices. Thus will preventive dentistry assume its true rôle and destiny rather than merely existing for the purely mechanical correction of dental syndromes.

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ORAL CONDITIONS IN THE FAMINE DISTRICT OF HISSAR

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INTRODUCTION

EVER since the disastrous famine of 1900, the Hissar district in the Punjab has been regarded as a potential famine area owing to scarcity of rains and consequent partial or complete failure of crops. Hissar is on the fringe of the monsoon area and famine has been officially declared in the district three times during the past ten years. It is known that famine or subfamine conditions have existed in this area for a considerable period before each official declaration.

The last official declaration of famine was made in December 1938, and a report was recently issued by the director of public health, Punjab, surveying health conditions and health measures adopted in the famine areas of Hissar. In this report, it is pointed out that, in the past, the primary objective in famine relief has been to provide the individual with means for obtaining a certain quantity of food rather than food of the right kind.

The need is stressed for an approach to famine relief work along physiologic lines, having due regard to energy expenditure, the greater needs of growing children and adolescents and the provision of a sufficiency of the protective foods.

In February 1939, the diets and state of nutrition of ninety families consisting of 529 individuals were investigated by the nutrition officer. The Public Health Report states:

The calorie values of the diets may be regarded as satisfactory, taking into consideration the comparatively light character of the manual labor on which the workers were engaged. The most striking feature of the diets is their qualitative defects. Animal fat in any shape or form is either absent or present in negligible amount. Milk also is either absent or present in very small amount and then only as skimmed milk. Green vegetables are entirely absent. The comparative absence from the diets of milk, ghee and vegetables means that the diets are very low in vitamin content. Vitamin A is present in quite inadequate quantity and vitamins C and D are absent altogether. Of the mineral salts, calcium is very definitely deficient, animal protein is present in very small amount. In short, the diets, if adequate in quantity, are extremely ill-balanced and contain a preponderance of carbohydrate material.

It is pointed out in the report that very few of the 37,767 individuals who died in 1939 were seen by a doctor during their final illness, as most of the deaths occurred in the villages in which there was no doctor. The survivors from families in which several members died and who were themselves suffering from acute scurvy maintained that their relatives who had died had the same complaints and outward signs of illness as themselves. The report states:

It is probable that many of the deaths recorded as due to "fevers" were really caused by starvation and deficiency disease and that many of the pneumonias and dysenteries were merely terminal illness in individuals suffering from malnutrition.

Numerous cases of specific deficiency disease were reported among patients treated in hospitals and dispensaries during the years 1937-1939. Commonest among these were scurvy, night blind-

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ness and other eye diseases, rickets and osteomalacia.

With the introduction of specific dietary measures, such as the issue of germinated grain, the morbidity and mortality figures dramatically decreased and outward signs of deficiency disease largely disappeared, only to reappear when specific relief measures were temporarily withdrawn. With the reintroduction of relief measures, the morbidity figures again rapidly declined.

It was apparent, therefore, that the health of the people in Hissar was safeguarded only by a very narrow margin even with the introduction of specific relief measures.

The people of Hissar are for the most part pitiably poor, but specific deficiency diseases such as scurvy occurred even in the richest families because of the impossibility of obtaining from the market protective foods such as vegetables and milk. Famine conditions are therefore due to lack not only of purchasing power, but also of food and especially of the right kind of food.

In view of these conditions, it was considered desirable to undertake an oral survey in this area with the object of determining the effect upon the teeth and supporting structures of these prolonged periods of malnutrition and of specific dietary deficiencies.

TABLE 1.—COMPOSITION OF GROUPS OF CHILDREN EXAMINED

Villages	Number Children			Religion				Average Age
	Male	Female	Total	Muslim	Hindu	Sikhs	Others	Age
Chaudry Was	79	0	79	38	31	0	10	11.48
Sewani	47	26	73	48	21	0	4	11.45
Barwa	28	7	35	3	32	0	0	12.34
Rathia	55	31	86	1	58	19	8	12.38
Ahrwan	18	23	41	41	0	0	0	12.10
Total	227	87	314	131	142	19	22	11.87

TABLE 2.—DATA ON TEETH PRESENT AND INDEX CARIES

Village	Number Children	Number Teeth Present			Number Cavities in Teeth			Number Cavities per Child	Caries Index
		Permanent	Deciduous	Total	Permanent	Deciduous	Total		
Chaudry Was	79	1,620	527	2,147	25	17	42	0.53	0.020
Sewani	73	1,676	271	1,947	27	8	35	0.48	0.018
Barwa	35	838	103	941	6	6	12	0.34	0.013
Rathia	86	1,842	334	2,176	40	38	78	0.91	0.036
Ahrwan	41	960	141	1,101	19	10	29	0.71	0.026
Total	314	6,936	1,376	8,312	117	79	196	0.62	0.024

DENTAL AND ORAL CONDITIONS

With the cooperation of the Public Health Department, a tour was made of some of the worst affected areas in Hissar. The investigation was undertaken after relief measures, such as the issue of germinated grain, had been introduced.

An oral survey was carried out in five villages: Chaudry Was, Sewani, Barwa, Rathia and Ahrwan, all within a radius of 50 miles of Hissar City. These villages were chosen for the investigation

because they were among the worst affected in the famine district.

It was decided to confine the investigation in the first instance to groups of children of an average age of approximately 12 years. With this known history of famine or subfamine conditions in Hissar extending over many years, it is safe to assume that, during almost the entire calcification period of the teeth, the children had suffered severely from either absolute or relative specific food deficiency.

Data were collected in relation to the incidence of dental caries, hypoplasia, dental plaques, calculus, gingivitis and allied gum conditions and malocclusion.

The Delhi-Shahpur salt range containing fluorine-bearing rock runs through Hissar, and most of the inhabitants were found to be suffering from chronic fluorine intoxication with the typical mottled enamel. Special attention was therefore given to this dental dystrophy in the course of the investigation.

TABLE 3.—CARIES DEGREE

Teeth	Extent of Caries			
	1st Degree	2nd Degree	3rd Degree	4th Degree
Permanent	93	16	3	5
Deciduous	20	41	8	10
Total	113	57	11	15

RESULTS AND DISCUSSION

The composition of the groups of children examined in the various villages with respect to community, age and sex is set out in Table 1. Of the 314 children in the complete group, Muslims and Hindus predominated, in almost equal numbers, with small numbers of Sikhs and others. The average age was approximately 12 years.

Table 2 shows the number of both permanent and deciduous teeth present and the number of carious cavities; the caries index calculated on the basis of the number of cavities in relation to the number of teeth present on examination, and the number of cavities per child.

In the total of 8,312 permanent and deciduous teeth examined in 314 children, only 196 cavities were found despite the fact that a great number of deciduous teeth were retained long beyond their normal term. Eight cases of arrested caries were included. Only 117 cavities were discovered in the 6,936 permanent teeth. The examination was carried out with the greatest care with mouth mirror and fine explorer.

In accordance with the usual procedure, numerical values were assigned to cavities on the basis of the extent of the caries process, as follows:

(1) Initial caries including softened or discolored pits and fissures giving lodgment to a fine explorer; approximal caries not freely accessible, and small carious points in any part of a tooth.

(2) Freely accessible approximal cavities and small open cavities involving less than one-fourth of the tooth.

(3) More extensive caries involving more than one-fourth, but less than two-thirds of the crown.

(4) Caries involving from two-thirds to complete destruction of the crown.

These results are shown in Table 3. It will be seen that of the very small total of 117 cavities in the permanent teeth, no fewer than ninety-three, or 80 per cent, were first degree only, leaving only twenty-four "open" cavities in the 6,936 permanent teeth examined.

Experience in this country has shown that many of these first degree cavities occurring in the pits and fissures, which at this age may give lodgment to an explorer, will never develop into open caries arising from the increased attrition and partial or complete elimination of the fissures because of the comparatively coarse nature of the diet.

The following additional outstanding

facts emerged from this portion of our investigation bearing upon dental caries incidence:

(a) The whole group of 314 children showed an average of only 0.62 cavities per child.

(b) Not one cavity was found in either the upper or the lower incisor teeth.

(c) Of the 314 children examined, 263, or 83.76 per cent, had no cavities in the permanent teeth.

(d) Of the 314 children, 233, or 74.20 per cent, were entirely caries free.

In order to obtain an understanding of the significance of the results just reported, it is necessary to make a comparison with other groups examined under similar conditions. This is done in Table 4.

The figures obtained in the present investigation are here compared with those of two other surveys made by me, one in Rochester, N. Y., U. S. A., and the other in the city of Lahore, India. The Rochester group comprised American "middle-class" children and the Lahore group Indian urban children of the middle class. There is a significant age variation in the groups, but it was proved that if we considered only the older children of the Hissar group, i.e., those of an average age of 13 to 14 years, the caries figure would have been even lower owing to the absence of deciduous teeth.

In America, great stress is laid upon the elimination of specific food deficiencies, and it is a well-known fact that the diet of the average American child approaches much more closely the modern concept of an adequate diet; yet we find that, in comparison with the children of the famine-stricken district of Hissar, American children have thirty-five times as many carious cavities.

The results of this investigation would

TABLE 4.—COMPARISON OF DIVERSE GROUPS

Group	Number Children	Average Age	Children Caries-Free Per Cent	Number Cavities per Child	Caries Index
Rochester, N.Y.	433	12.94	0.20	21.76	0.83
Lahore, India	756	13.58	5.95	5.74	0.21
Hissar (India) famine area	314	11.87	74.20	0.62	0.02

TABLE 5.—INCIDENCE OF CALCULUS, PLAQUES AND GINGIVITIS

Village	No. Children	Calculus				Plaques				Gingivitis						
										Hypertrophic			Non-Hypertrophic			
		+	++	+++	Per Cent Affected	+	++	+++	Per Cent Affected	+	++	+++	+	++	+++	Per Cent Affected
Chaudry Was	79	34	25	16	94.93	31	33	15	100	26	18	16	7	2	1	88.61
Sewani	73	25	23	12	82.19	19	41	11	97.26	21	23	10	4	1	—	80.82
Barwa	35	10	13	6	82.86	16	15	3	97.14	12	9	2	4	—	—	77.14
Rathia	86	36	22	11	80.23	30	47	17	97.67	33	27	10	–	1	—	82.56
Ahrwan	41	21	14	1	87.80	12	17	12	100	18	15	6	–	—	—	95.12
Total	314	126	97	46	85.67	98	153	58	98.41	110	92	44	15	4	1	84.71

therefore seem to constitute strong evidence against the various dietary hypotheses which have been advanced in an effort to solve the problem of the etiology of dental caries. The evidence here produced affords strong support to the conclusion already reached in our earlier investigations in India, i.e., that, from the viewpoint of biologic value and its influence on metabolic processes, the quality of the diet is not the deciding factor in caries immunity or susceptibility. The teeth do not appear to share in the general bodily deterioration consequent upon dietary deficiencies. Structural changes in the teeth do follow specific food deficiencies, especially of vitamins and mineral salts, but adequate evidence has not so far been produced to support the contention that these changes are directly concerned with the caries process.

It would seem justifiable to conclude that other more potent conditions are operating to produce and maintain immunity to dental caries. We cannot overlook or underestimate the factor of heredity; but our investigations among urban children show that this hereditary immunity is rapidly broken down under the influence of other environmental factors and on departure from a traditional and simple diet.

The results of this investigation confirm the conclusions based on our earlier investigations in this country and emphasize the importance of the physical rather than the chemical nature of the diet, its detergent or cleansing properties, the infrequency of meals and the comparative absence from the dietary of sugar and other fermentable carbohydrates which favor the action of the aciduric organisms. Despite this extremely high immunity to dental caries, examination showed that the state of oral hygiene was very poor as judged by the incidence of tartar formation, the presence of dental plaques and the condition of the soft tissues.

Data relative to these conditions are presented in Table 5. It will be seen that the percentage of children affected by the deposition of salivary calculus ranged from 80 to 95 in the villages under investigation, the average for the whole group being over 85 per cent. The deposits varied from slight to severe. This very high incidence of calculus deposition in a group of children with an average age of only 11.87 years and showing an extremely low susceptibility to dental caries seems to support the idea of a certain antagonism between calculus formation and the caries process.

Dental plaques were found to be almost universally present. The incidence in the different villages varied from 97 to 100 per cent, with an average incidence for the whole group of 98.41 per cent. Under the conditions reported, the presence of these plaques would appear

TABLE 6.—MOTTLED ENAMEL (FLUOROSIS)

Villages	Number Children	Mottled Enamel			Total Affected	Per Cent Affected	Staining Number Affected
		Slight	Moderate	Severe			
Chaudry Was	79	30	25	12	67	84.81	4
Sewani	73	12	20	40	72	98.63	31
Barwa	35	8	8	3	19	54.28	5
Rathia	86	25	17	6	48	55.81	3
Ahrwan	41	19	5	1	25	60.98	1
Total	314	94	75	62	231	73.57	44

to have no bearing upon the caries process, especially in view of the fact that both upper and lower anterior teeth were in all cases entirely caries free.

A remarkably high incidence of gingivitis was found in all the villages investigated in the Hissar famine area. Gingivitis of one form or another and in varying degrees of severity was observed in 84.71 per cent of the children examined. In addition, thirteen cases of chronic suppurative periodontitis were noted despite the fact that the average age of the group was under 12 years.

Reference to Table 5 shows that, of a total of 266 cases of gingivitis in the 314 children examined, 246, or 78.34 per cent, of the number examined were suffering from gingivitis of the hypertrophic variety. This condition of generalized hypertrophic gingivitis occurred usually as a hard fibrous and painless swelling of the gums characterized by more or less uniform thickening or hyperplasia of the marginal gingivae. As has been pointed out by Box, there is usually a more or less definite line of demarcation running parallel to the gingival margin and the condition has been referred to as "McCall's festoons." In the early stages, it is said to be due largely to edema.

The pathology of this condition is not completely understood, but it is thought to be due to atrophy of the epithelium and hyperplasia of the connective tissue papillae. Its etiology is still in some doubt. Both local and systemic etiologic factors have been suggested. In India, the habit of cleaning the teeth with the teased ends of twigs from certain trees cannot be disregarded. This may result in traumatic injury to the gingival tissues. Many cases of generalized hypertrophic gingivitis have, however, been observed where this practice is not followed.

Poor oral hygiene has also been advanced as a possible causative factor, but the condition is frequently seen in mouths that are perfectly clean and well cared for and in which incrustations of tartar and dental plaques are entirely absent.

The fact that this condition is frequently associated with Vincent's infection has led some writers to the conclusion that it is the result of a fusospirochetal infection. If this were so, one would expect other typical manifestations of Vincent's infection in at least some cases in a large group. No case of Vincent's or suspected Vincent's infection was observed among the 246 children with hypertrophic gingivitis seen in Hissar. It seems more probable therefore that if a fusospirochetal infection did occur in association with this condition, it would be secondary to the original condition.

In the light of these and earlier investigations in this country, it seems highly probable that the very high incidence of hypertrophic gingivitis is due to specific dietary deficiencies extending over long periods, perhaps aggravated by mechanical irritation and lack of oral hygiene.

The incidence of malocclusion in the famine district of Hissar was found to be significantly less than in the urban districts of the Punjab. Of the 314 children examined, malocclusion was found in 132: Angle's Class I, 39; Class II, 92; Class III, 1.

Dental irregularities were thus present in 42 per cent of the Hissar group. This figure is significantly lower than the 50 per cent malocclusion previously reported in a group of 756 Lahore School children.

FLUOROSIS AND MOTTLED ENAMEL

The Delhi-Shahpur salt range, which runs obliquely across the Punjab province, passes through Hissar. As at Kasur, where this condition has already been investigated, the range is not visible above the surface level, but lies buried under alluvium. The fluorine-bearing

rock of this range is responsible for the high fluorine content of well water in endemic areas and this, in turn, is the causative agent in the condition of mottled enamel, the characteristic dental manifestation of chronic endemic fluorosis.

The opportunity was therefore taken to investigate these conditions in Hissar to supplement our earlier findings at Kasur. The results of this investigation are set out in Table 6.

Analysis of well-water samples from Hissar showed an average fluorine content of 1.62 parts per million, and 1 part per million of water is sufficient to cause the phenomenon of mottling. At Kasur, the average fluorine content of the well water examined was 2.23 parts per million, and 100 per cent of the children examined were affected.

At Hissar, as will be seen from the table, the percentage of children affected varied considerably in the different villages. The incidence was highest in Sewani (98.63 per cent), and here too, the teeth were affected with the greatest degree of severity, both with regard to enamel mottling and the secondary effect of staining, despite the fact that the average age of the children in this village was the lowest. The lowest incidence of mottling was recorded at Barwa (54.28 per cent). Inquiry elicited the information that much of the water used for cooking and drinking purposes was obtained from a pond in the village although deep wells were also used to some extent.

SUMMARY

An oral survey in five villages of the famine district of Hissar provides further evidence against the various dietary hypotheses regarding the etiology of dental caries. So far as the caries process is concerned, the teeth do not appear to share in the general bodily deterioration consequent upon dietary deficiency. Evidence is advanced that, from the viewpoint of biologic value and its influence on metabolic processes, the quality of the diet is not the deciding factor in caries immunity or susceptibility.

Despite the known specific dietary deficiencies which existed during the period of calcification of the teeth, the whole group of 314 children showed an average of only 0.62 cavities per child; 74.20 per cent were entirely caries-free and 83.76 per cent had no cavities in the permanent teeth; and not one cavity was found in the upper or lower incisor teeth.

It is probable that the very high incidence of hypertrophic gingivitis is due, at least in part, to long-continued specific dietary deficiencies.

The occurrence of the characteristic enamel mottling of chronic fluorosis indicates that Hissar is an endemic area. Investigations are still proceeding in an attempt to determine whether fluorosis has any definite bearing on the caries process.

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HEALTH CONSERVATION OF THE PERIODONTAL TISSUES BY A METHOD OF FUNCTIONAL PARTIAL DENTURE DESIGN

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IN this paper, I shall confine myself to what I believe to be a few of the cardinal principles upon which a functional or health-preserving restoration of missing teeth must be based. These, in their broadest sense, are even distribution of force, passivity and lateral pressure.

Some of these principles are old; some are applied from a new point of view, and some are wholly new.

Let us consider, therefore, the importance of these fundamentals to preservation of the periodontal tissues and a method of construction that will incorporate them in practical usage.

EVEN DISTRIBUTION OF FORCE

It has been fairly well established that the more evenly masticatory force can be distributed and over the largest area possible, the better. This in itself is not enough. To it must be added two governing factors; namely, that this force should not only be distributed over the largest tolerable area possible, but also in a manner not to jeopardize any one of the other requisites for the preservation of tissues.

In the body, there are tissues that will not tolerate pressure, an extreme example of which is the eye, while others, such as the soles and heels, will tolerate considerable pressure. The same is true of the tissues of the mouth. The teeth and ridges were developed by Nature to tolerate the stress of mastication, and it is here that the stress must be placed. The roof, floor and vestibule of the mouth will not tolerate pressure, and therefore if we extend our appliances into these areas sufficiently to absorb some of this force, the areas will have to be relieved until the pressure is eliminated.

If we slight any of these fundamental principles, we may promote better distribution of force, but, unless we are extremely careful, it will often be attained at the expense of other qualities that should be incorporated in the restoration.

I believe that a good rule for the distribution of force is: An artificial restoration or partial denture should be so designed that it distributes the force of mastication evenly over the largest tolerable area possible, but does not do so at the expense of any other fundamental principle.

PASSIVITY

An appliance must be passive to be comfortable. It must be passive to protect the periodontal tissues. This means that it must not pull or press upon either the hard or the soft tissues of the mouth when masticatory pressure is released. This assures the rest periods so essential to health. It is a mistake, in my opinion, to take impressions of saddle areas under pressure with the idea that this procedure will assure more even distribution of

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the masticatory force. When such sustained pressure is incorporated in an appliance, we invite periodontal lesions and abnormal recession of the alveolar process, because of the trauma incurred.

Impressions should be taken without compression, with the tissues in the passive state. The restoration, however, should be so designed that although it is passive during rest periods, it will, when

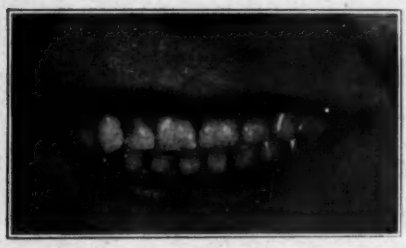

Fig. 1.—Case constructed for woman patient thirteen years ago. The upper central and lateral incisors were restored by jacket crowns, the two cuspids with post crowns and the remainder, exclusive of the upper left second molar, with a partial denture.

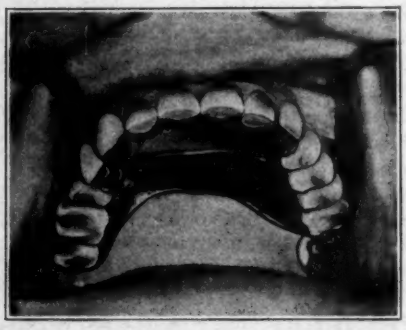

Fig. 2.—Detailed attachments and arrangement of case in place in mouth of patient referred to in Figure 1. This case was an utter failure.

the pressure of mastication is brought to bear upon it, distribute this force evenly over the largest tolerable area possible.

LATERAL PRESSURE

Lateral pressure, I believe, causes more periodontal destruction in the replacement of missing teeth than any other one condition. Particularly is this true because this stress is often incorporated in the appliance without the dentist's being aware of it.

The detrimental effects of lateral pressure caused by improper occlusal re-

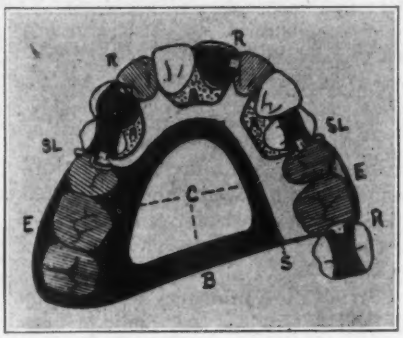

Fig. 3.—Black portions of teeth, castings into which rests and attachments of case are inserted. R, rests. SL, the spring-wire lock attachments. The lightly shaded portion is the tooth-bearing entity and the more heavily shaded part the tissue-bearing portion. The dotted line S indicates the position of the soldered joint between the two and shows the extent to which they are joined.

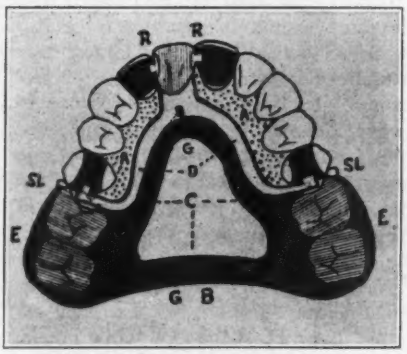

Fig. 4.—Case that looks different from that shown in Figure 3, but in which same principles of design have been followed.

lationship, though not always avoided in practice, are commonly accepted.

There is, however, another and very severe form of lateral pressure that can

be transmitted to the abutment teeth even though occlusal relations are correct. Even ordinary centric relation can cause tremendous lateral pressure under certain conditions.

A case which I restored about thirteen years ago, shown in Figures 1 and 2, illustrates this point. The four upper anterior teeth carry jacket crowns. The upper left second molar was restored with an inlay which incorporated a Gollobin attachment. The cuspids, which had been devitalized previously, were restored with post crowns, and incorporated with them were split bars for the retention of the denture. It will be observed that the third molar is in place on the left side, but that all teeth posteriorly from the cuspid on the right side are missing. It was therefore necessary to make the right side tissue-bearing and the left side tooth-bearing. In order to meet these requirements, we placed a cantilever stress-breaker in the first premolar pontic on the right side, Figure 2, and as we wished to be sure that the left side would not receive any tension during function of the denture, we placed a watch hinge in the palatal bar just left of the height of the vault.

This case, although esthetically commendable, was an utter failure. The patient was compelled to be out of town for a few months, and when she came into my office again, all three abutment teeth were so loose that they could almost be removed with the fingers. Why?

We all know how the buccal portion of the upper alveolar process is resorbed after extraction and how the lingual portion of the lower exhibits the same tendency, with the result that the upper jaw is generally smaller than the lower in the edentulous mouth, though the reverse

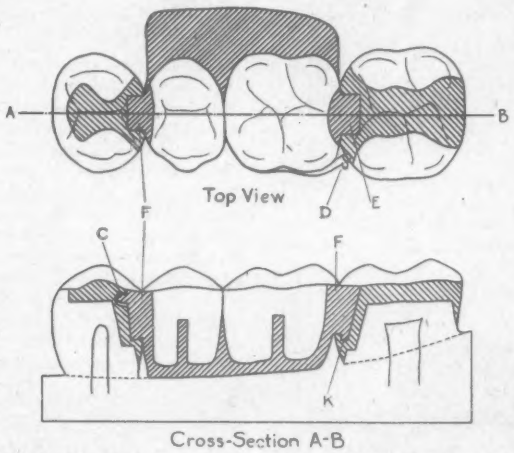

Fig. 5.—Sketch of simple spring-wire and insertion pin-lock bridge to show mechanics of insertion lock C-F and spring-wire lock D-K. The top view shows two inlays, two pontics and two rests. The line AB, passing through the occlusal surfaces of these teeth, represents the imaginary cutting of the model. The cross-section which would thus be produced is shown below. In the cross-section, attention is drawn to the position of the inlays, rests and pontics. The rests, of course, take the burden of mastication. The insertion pin lock C prevents the anterior end of the bridge from coming out of place, while the spring-wire lock D (top view), which catches under the ledge in the inlay, prevents the posterior end from becoming displaced. The U-shaped lock K (cross-section), in the base of the inlay rest, keeps the molar from being moved distally by the spring wire, while the 30-degree angle of the floor, in conjunction with the insertion pin lock in the premolar rest, retains that tooth in position.

was true when the mouth contained the full complement of natural teeth.

For esthetic purposes, the pontics had to be set buccally from the ridge. This, unknown to us, constituted a lever upon the abutment teeth. The ridge became the fulcrum, the pontics the weight end and the vault the power end of the lever. If the long end had been rigid, it would have acted as a stabilizer, so that tremendous pressure on the weight end could have been neutralized by but slight stabilizing pressure on the opposite side. Instead, we added a watch hinge to help break this rigidity, thus making the long arm another lever having its fulcrum at the hinge, with the result that the entire lateral force, even in perfect centric relation, was multiplied and transmitted to both sides. Of course, these teeth could not tolerate this strain and so they broke down.

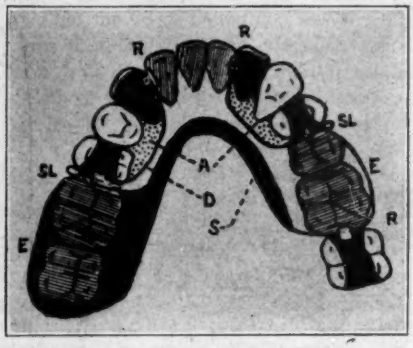

Fig. 6.—Lower denture designed in exactly same manner as upper, except that lingual bar is naturally used instead of palatal bars. Otherwise, the method of design and construction is the same.

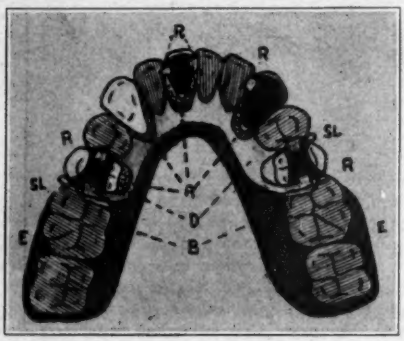

Fig. 7.—Same principles of design (compare Figure 6) except that tissue-bearing parts occur on both sides of mouth because there are no teeth posteriorly from these spans.

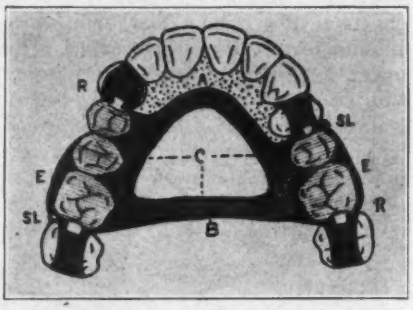

Fig. 8.—Case consisting of two small spans with teeth posterior to both, which should therefore be made entirely tooth-bearing. Its construction is the same except that the tissue-bearing part has been eliminated. It does necessitate the two definite rests and spring-wire locks as shown in the design. By employing the double bar construction, it is possible to increase rigidity with the same amount of bulk because these bars are thrown in different planes. Rigidity here is of utmost importance as it reduces to a minimum the lateral force in centric occlusion upon the abutment teeth, which is so detrimental to the welfare of the periodontal tissues.

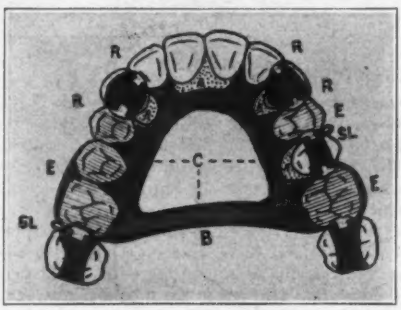

Fig. 9.—Same design as in Figure 8, except that it supplies different teeth. The principle is the same.

To prevent this breakdown in future cases, we began making dentures with double bars in order to get rigidity across the vault; but we found that, when the short arm was sufficiently long, as was too often the case, the bars could not be made rigid enough to absorb the entire strain. To overcome this detrimental force, we designed and have been using a system of stressbreakers since 1929. (Figs. 3 and 4.)

In order that this system of stressbreakers may be more easily grasped, we have formulated a rule for the design and construction of those cases in which part of the appliance must be tissue-bearing. The rule is: All the tooth-bearing parts of a partial denture should be joined to form one entity, and all the tissue-bearing parts joined to form another. These entities should then be soldered together, and the remoteness of the soldered joint from the tissue-bearing saddle or saddles will control the amount of tissue-bearing properties which the tissue-bearing parts of the appliance will possess.

In the case in Figure 3, therefore, we have as our tooth-bearing entity all the rests and the two single missing teeth, as well as the premolar and the molar on the left side. As these entities are too small to be anything but tooth-bearing, they are joined as one unit. This is accomplished by forming the rests and running the line S paralled to the A reliefs. The cutout C is then drawn (Fig. 3) and we have the design of the case, all small entities of which are tooth-bearing, while the saddle, consisting of the darker shaded portion, is primarily tissue-bearing. The length of the soldered joint (the dotted portion of the line S) controls the remoteness of the joint from the tissue-bearing saddle and thus the amount of tissue-bearing property that the shaded saddle will possess.

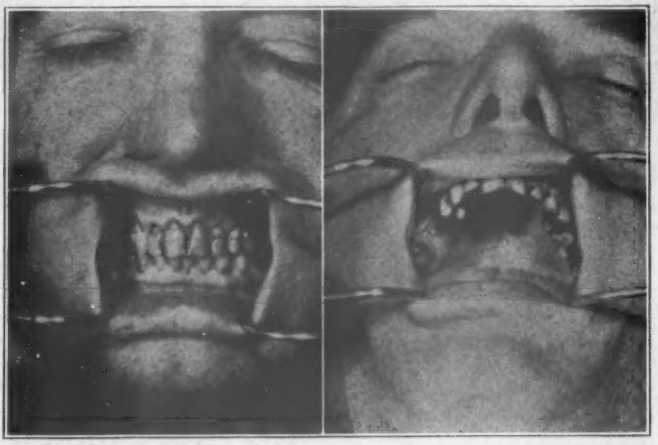

Fig. 10.—Mouth of Mr. L. before treatment. The upper left first and second premolars were extracted because of apical infection. All the other teeth were vital. The disturbed condition of the gums is evident.

Let us see how this design complies with the cardinal principles; i.e., even distribution of stress over the largest tolerable area possible, lateral pressure and passivity, no one of these in any way jeopardizing the others.

The stress taken by the tooth-bearing (light-shaded) part has been distributed over several teeth, and it is actually tooth-bearing as it contains definite rests in inlays. The right central incisor and

left cuspid were not used because they contained no fillings or caries. They were considered unnecessary as the other five teeth were sufficient to carry the load. If they had been carious, however, they would have been included.

The tissue-bearing part (heavily shaded), made so by the stress-breaking arm from the attachment on the right premolar to the beginning of the dotted line S, allows the even distribution of force over this entire saddle area and not solely on the premolar tooth and the heel of the saddle as is common.

If the occlusion is correct, lateral stress upon the abutment teeth has been minimized if not eliminated, because the stress is broken laterally as well as vertically. Thus, even though the bars are not sufficiently rigid to prevent slight flexion during the process of mastication, these tissue-borne teeth can move buccally without dragging the abutment with them. The force transmitted by the palatal bars (long arm of the lever) is changed from lateral to vertical pressure and is neutralized by but little force on the other side of the mouth. This slight

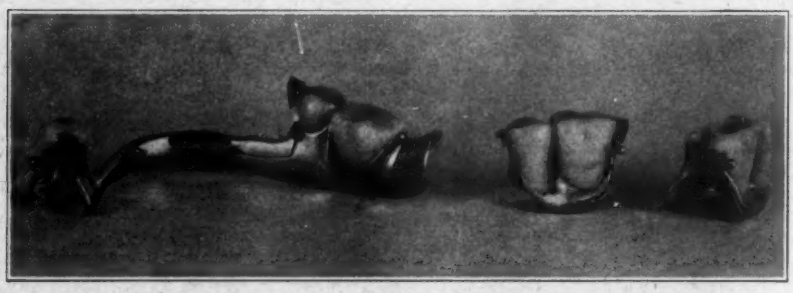

Fig. 11.—Two spring-wire lock bridges and lower spring-wire lock bilateral partial denture constructed for Mr, L. The construction of the bilateral partial denture is to be noted. The tooth-bearing parts are made as an entity and the tissue-bearing parts as another.

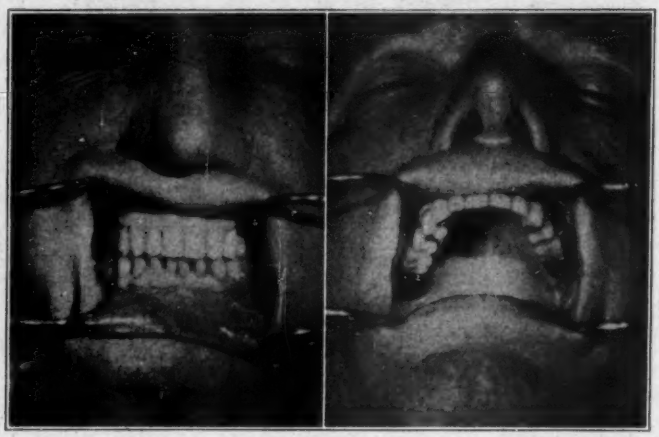

Fig. 12.—Mr. L. after treatment; showing marked improvement in appearance of gums. All remaining teeth are vital.

force, which is now vertical, is minimized still farther by being distributed over all of the abutment teeth.

PASSIVITY

This case is passive because impressions have been taken with the tissues at rest, and as soon as the force of mastication is removed, the resiliency of the stress-breaking arm allows the saddle to return to its original passive position.

The tooth-bearing parts are passive because of the type of attachments used. It was because I was dissatisfied with the use of clasp, frictional and other types of attachments that I devised, in 1929, what are known as the spring-wire insertion attachments. (Fig. 5.)

Fig. 13.—Mouth of Mr. C. before treatment. Although all teeth were vital, they were badly broken down by caries and traumatized by close bite. The abnormal condition of the gums is evident.

The rests for these attachments diverge on the lingual, buccal and axial walls. This prevents binding and promotes ease of manipulation. This property is particularly valuable when one or more toothbearing spans are present. Where the replacement is extensive and the natural teeth few, we have found that the natural teeth are depressed in their sockets owing to the vertical pressure. When this happens, the saddles infringe on the gum tissue and, unless they are relieved, become intolerable to the patient. If dressed down, the saddle offers but temporary relief as the appliance will again settle. As there is no frictional hold on the spring-wire lock rests, slight relief of the insertion pin at C and at the end of the spring-wire lock at D will allow the resiliency of the gum to move the saddle occlusally when masticatory force is removed and allow passivity during these rest periods. This does not in any way interfere with the complete

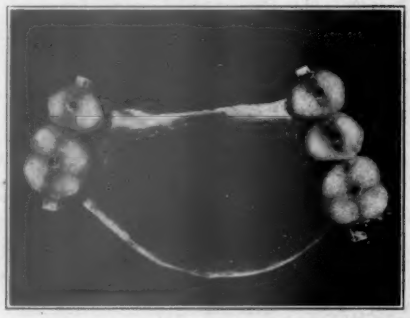

Fig. 14.—Insertion pin spring-wire lock bilateral partial denture made to restore missing teeth. The rigidity of the bars across the vault of the mouth is to be noted.

Fig. 15.—Finished case in centric relation. The periodontal condition has been cleared up and the appearance of the entire mouth enhanced.

resistance to displacement during function. As the saddles now help to take up the force during the pressure periods, depression of the teeth is avoided and, because this pressure is not sustained, no ill-effects manifest themselves on the saddle. This assures us that the case will remain passive.

By eliminating lateral pressure on the remaining teeth; by having the tooth-bearing and tissue-bearing parts of the restoration passive when masticating force is released, and by distributing this force during function over the largest saddle and tooth-bearing areas possible, we have built into the case the properties that offer the maximum conservation and maintenance of health of the ridges and periodontal structures. Figures 6 and 7, though of different teeth, show how these principles are maintained in all cases wherein one or more saddles have no teeth posteriorly from them.

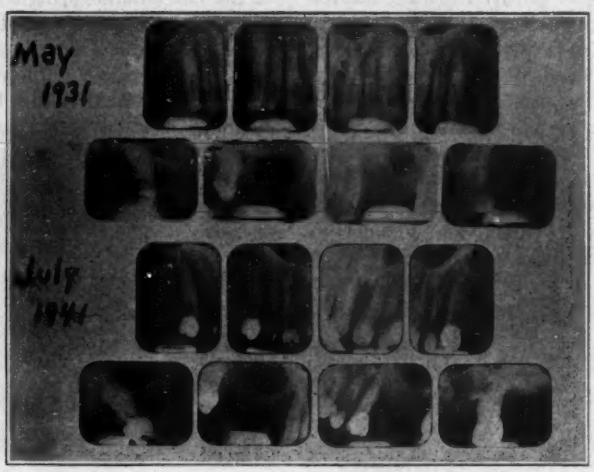

Fig. 16.—X-ray film of Case 2 (Mr. C.) upper jaw.

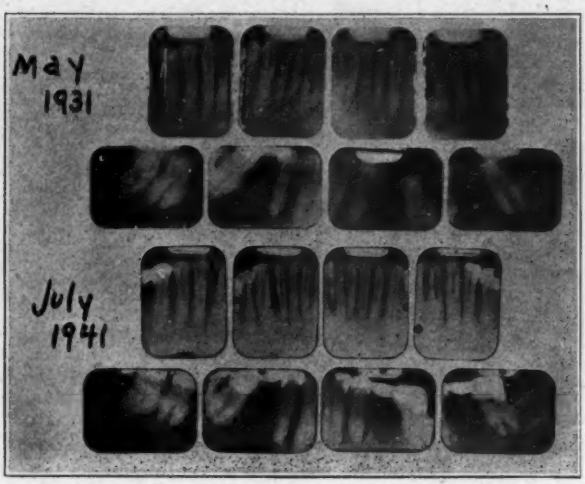

Fig. 17.—Lower jaw (Mr. C.). Slight change has taken place in this mouth over a period of ten years.

When there are teeth posteriorly from

the saddle, and no span exceeds four teeth or a cuspid (Figs. 8 and 9), the same procedure is followed, with slight variation. This is primarily a tooth-bearing restoration. The rests act as the fulcrum instead of the ridges, and because these rests can be placed further buccally, lateral pressure in centric relation can be diminished considerably.

Ordinarily, two unilateral bridges (Fig. 9) would be made here. We use a bilateral restoration such as this, how-

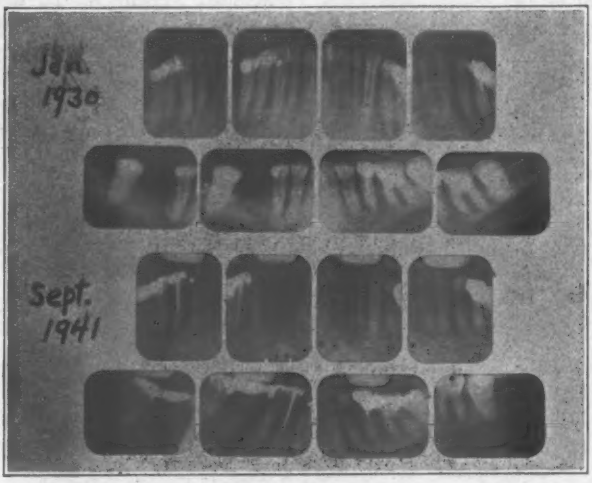

Fig. 18.—X-ray films before restoration was made and the condition of the mouth (lower jaw) eleven years later (Case of Mrs. M.).

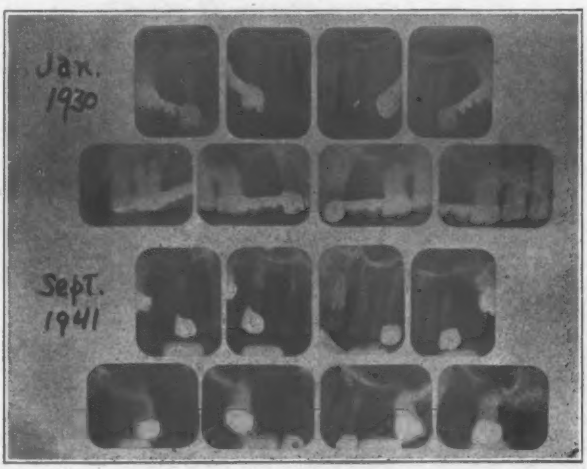

Fig. 19.—Condition of mouth (upper jaw) of Mrs. M. before restoration and eleven years later. Although three teeth, which should have been extracted in the first place, were lost, the abutments were not affected.

ever, when, owing to disintegration of the periodontal tissues, maximum protection of the abutment teeth is indicated. The double bar construction across the roof of the mouth minimizes lateral pressure upon the abutment teeth and the spring-wire lock rests allow the passivity and distribution of force as previously explained. Here, we have an entirely tooth-bearing appliance (owing to the short span and posterior teeth that are present) except when the abutments are depressed and the saddles are compelled to take some of the load as previously explained. In the more extensive cases, unless the saddles help, a few abutment teeth must carry the entire load.

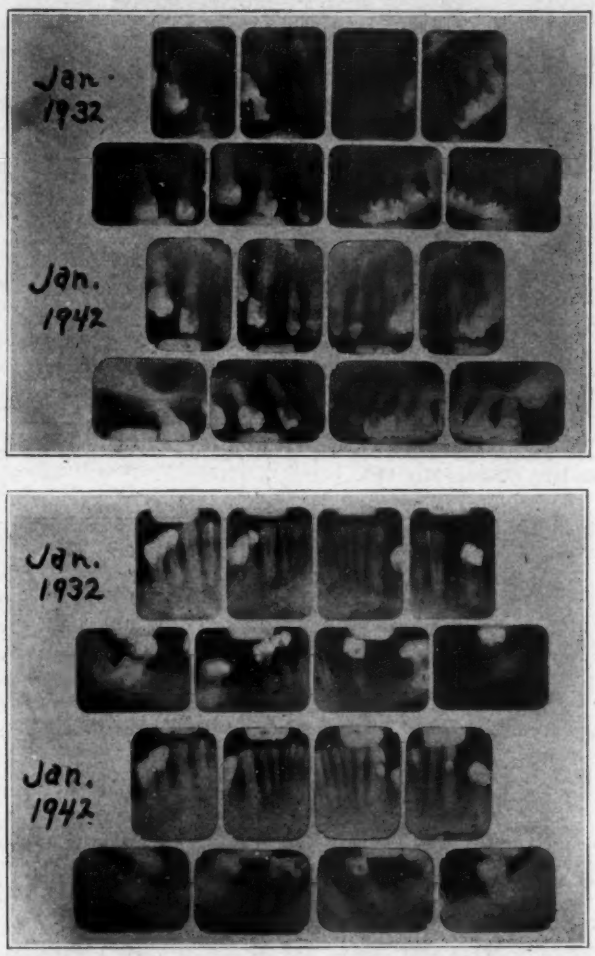

Fig. 20.—Advanced periodontoclasia (above) and slight change in mouth over period of ten years (below). (Case of Mrs. L.)

Lateral pressure must be minimized if not eliminated to maintain health. If

this has not been done, we do not have to be concerned about the depression of teeth, because lateral pressure will cause their extraction instead of depression.

Figure 10 shows a case constructed by this system some time ago. There was considerable occlusal trauma and a mass of patched fillings present. Jacket crowns and porcelain inlays were used in the reconstruction of the mouth. Functional occlusal relation was established and the two unilateral and lower bilateral bridges (Fig. 11) were constructed. The condition of the periodontal tissues of this mouth after the reconstruction and treatment were completed is shown in Figure 12.

Figure 13 shows a somewhat similar case, but here the abutment teeth had been damaged to the point where a bilateral partial denture (Fig. 14) was restored in order to reduce stress upon the teeth to a minimum. The improvement in the health of the mouth is evident in Figure 15.

Figures 16 and 17 (Mr. C.) show two sets of x-ray pictures of this case. The two upper rows of each were taken in May 1931, just before the case was made, and the two lower rows ten years later. Slight change has taken place.

Figures 18 and 19 (Mrs. M.) show the upper and lower jaws of another patient. The upper fixed bridges were removed and a bilateral bridge was constructed. A small semifixed bridge was made for the lower. Because of periodontoclasia, the upper right second and third molars and the upper left second molar were lost five years later and these replacements were added to the case. It is interesting to note that, although these teeth were lost, the teeth to which the bridge was attached show little or no change after a period of eleven years—and this in a mouth broken down with periodontoclasia.

Figures 20 and 21 (Mrs. L.) show another case of periodontoclasia. Although a few pyorrhea pockets can be seen on

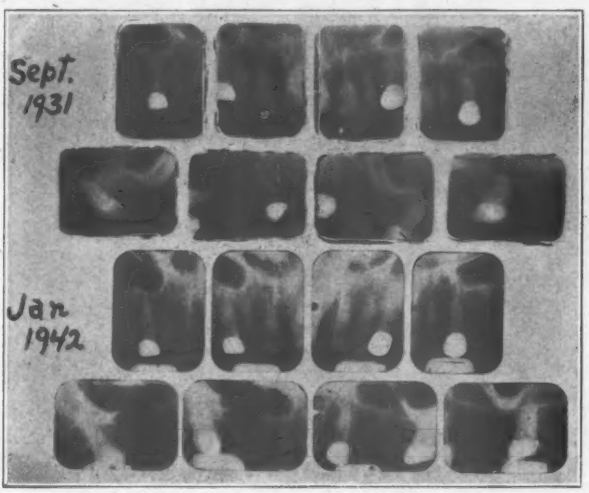

Fig. 22.—Case of Addison's disease. The patient (Mr. McG.) was in poor general health even before the original pictures were taken in 1931 and is still suffering from this malady. In spite of the unfavorable history, no teeth were lost and the periodontal structures show little or no change over a period of ten and one-half years.

the roentgenograms taken in 1932, all of these teeth have been retained to date, while the periodontal tissues show little change ten years later.

Figures 22 and 23 (Mr. McC.) is of a patient who, I understand, is the oldest living person suffering from Addison's disease on record. This patient had just recovered from a collapse when the pictures were taken, in 1931. In spite of the unfavorable medical history, the periodontal tissues manifested little if any change eleven years later.

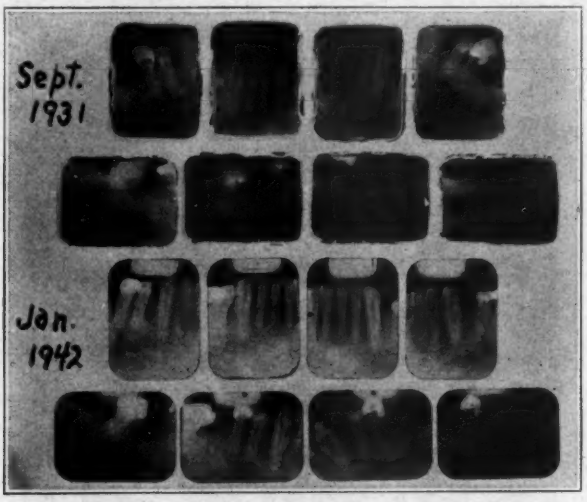

Fig. 23.—Lower jaw of Mr. McG.

These are the types of patients who, if not properly and carefully handled, would all be wearing full dentures today. By proper and careful handling, I refer not only to the reconstruction of the mouth, but also to proper and careful periodontal service, both before and after such reconstruction. Periodical prophylaxis and occlusal check-ups are essential if the patient is to get the best service from a restoration.

It is true that reconstruction by this system is a time-consuming service which requires considerable knowledge and a high degree of skill, and therefore cannot be cheaply rendered. The cost, however, should be looked upon by the patient as a capital outlay, and as these services continue to pay dividends over a period of many years, what at first seemed expensive becomes inexpensive in the long run. Add to this the extra dividends received in comfort and health, with low maintenance, and we will agree that this type of service constitutes an excellent investment, rather than an expenditure, of the time and money originally consumed.

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PRACTICAL FLUORINE THERAPY IN DENTAL CARIES CONTROL

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PROBABLY no approach to the dental caries problem has ever held such promise of effective control as the use of fluorine. However, because of certain pathologic reactions to the ingestion of fluorides under special conditions, and also because of the present limited data available relative to the physiologic rôle of fluorine in the general systemic metabolism, progress in developing a fluorine therapy to meet practical requirements has been necessarily slow, involving considerable preliminary experimentation and study.

The caries-inhibiting value of certain fluorides in connection with the drinking water of various areas throughout the country has been well established wherever the fluorine content approximates one part per million or more. Accordingly, and in an endeavor to duplicate such results in protection, it has been proposed that fluorides be added to the drinking water of other communities in the strength of one part per million, a quantity which is considered both safe and effective for general usage.

While such a proposal offers various practical advantages and benefits, it is also open to several definite objections, which are bound to limit both its effectiveness and its general adoption: 1. It places a very direct responsibility upon the community authorities who sanction the plan of fluorinizing the drinking water—a responsibility that few would be willing to assume in view of the present limited knowledge of fluorine, physiologically and pathologically considered. 2. It would require every individual to use that water for drinking purposes, regardless of whether he believed such water to be safe to drink. 3. There could be no definite ration control of the amount of such fluorides ingested for meeting individual requirements, since seasonal changes, temperature, nature of occupation, exercise, age and water-drinking habits would all serve as modifying factors in the matter. Thus, these obvious objections to such a plan would appear to outweigh its practicability.

Before any applied fluorine therapy can be made effective and practical, consideration must be given to two other attending factors involved in any high degree of immunity, calcium and phosphorus, of which the teeth are known to be largely composed. Investigation of the underlying causes for the remarkable caries-immunity in the vicinity of Hereford, Texas, disclosed an unusually high content of both calcium and phosphorus in the soil from which the local food is grown, and also a fluorine content in the drinking water of more than two parts per million. Reports relating to this unprecedented immunity experience under modern diets clearly indicate that the calcium-phosphorus factors were likewise involved in such immunity. Research in fluorine-calcium interaction has indicated that the presence of a certain amount of fluorine is necessary for the deposition of calcium salts, and that calcium itself reduces the toxicity of fluorine.[1] Thus, a calcium accompaniment as a balancing factor for fluorine appears to be a physiologic requirement that should not be overlooked when any therapy involving the ingestion of fluorides is contemplated.

With the foregoing consideration in

mind, I wish to propose herewith a fluorine-calcium-phosphorus therapy for the systemic control of dental caries, a therapy strictly in accordance with Nature, safe, efficient and practical—the use of prepared "edible" bone in our diet.

The fundamental value of bone as a food for combating dental caries can be appreciated only when the basic nature of such bone is fully revealed, together with the vital rôle it plays in the mineral nutrition of virtually all carnivorous creatures except civilized man himself. Gray[2] gives the following analysis of the constituents of normal bone: organic matter, 33.30 per cent; calcium phosphate, 51.04 per cent; calcium carbonate, 11.30 per cent; calcium fluoride, 2 per cent; sodium salts, 1.20 per cent, and magnesium phosphate, 1.16 per cent.

It will be noted that an appreciable amount of fluorine is found to be a basic constituent of normal bony tissue, apparently indispensable for normal construction and strength of not only the bones, but also the teeth, which are known to be essentially the same in mineral content as the other animal bone that we may use as a food. Recent analysis indicates that beef bone normally contains more than 350 parts per million of fluorine.[3] Here is a veritable storehouse of this element for our use in the safest, physiologic form, already accompanied by calcium and phosphorus in a Nature-prescribed combination and "balance" for a mineral food.

Thus, a general consideration of the fluorine content of strictly normal bone provides a clear index as to the relative proportion which Nature itself prescribes, in combination with calcium and phosphorus salts, for meeting the needs of resistant teeth as well as strong bones within the body. Where we have heretofore stressed the need for an adequate calcium-phosphorus supplement to the diet in proper ration and balance, it is apparent that we should consider the calcium-phosphorus-fluorine ratio in determining such supplement.

Although scientists have lauded milk as a tooth and bone builder for the child particularly, because of its high calcium-phosphorus value, it is a well-known fact that such milk has largely proved a failure in protecting the teeth against decay thereafter, presumably owing to a lack of that calcium "fixing" element, fluorine, which, when available as a calcium accompaniment, appears to render the teeth largely immune to caries. Whereas milk, as consumed, shows but 0.4 parts per million of that vital element fluorine, approximately 2½ quarts being required to provide 1 mg. of fluorine, but 3 gm. of normal bone is needed to supply this fluorine equivalent, which is now considered the basic unit required daily for preventing dental caries.

Biologic studies clearly indicate that virtually no meat-eating creature except modern, civilized man depends on milk as a source of calcium after the "weaning" stage, when they have completed their first dentition and are capable of ingesting the more solid types of food. From such weaning time, throughout adult life, it is a well-known fact that all such carnivora must obtain their calcium ration almost exclusively from the blood and bone of the animals utilized as food, particularly the bony structures in which Nature has stored the vital mineral elements in such concentrated form and in exact physiologic proportions.

Notable among the bone-eating animals is the dog, to whom a bone ration is virtually indispensable for normal growth and well being, as every dog owner will readily agree. Furthermore, among all such bone-eating creatures, soundness of teeth as well as bony framework is the rule rather than the exception, ostensibly owing to a considerable extent to that fluorine factor found so abundantly in bone, but which is so

obviously lacking in the diet of the average civilized man today.

The utilization of bone as a vital mineral food is nothing new to primitive people and to others of the older countries of the world. The fish-eating Indians and the Eskimos of the Pacific Northwest have long been accustomed to eating the softened fish bones, together with the flesh. By the Eskimo, such bones are recognized as an essential factor in the diet for replenishing the bony structures of their bodies. The teeth of such individuals are almost incomparable, as indicated by Price[4] in his study of the teeth of primitive people throughout the world. In fish, as in the case of animals, the fluorine content of the bones is always high, being beyond 250 parts per million.

In ancient Tibet, a recent report[5] states, the most cherished gifts received by a new mother consisted of powdered yak bone and pigs knuckles, to aid in meeting the systemic demands for bone-building and tooth-protecting elements following the birth of a child. Thus, the natural instinctive wisdom of more primitive folk tends to direct them unerringly to the most abundant supply of calcium, phosphorus and fluorine available—the bony, animal parts.

The unusual value of bone as a source of available calcium and phosphorus, together with their retention, is readily disclosed by a recent report from India,[6] where calcium deficiency constitutes one of the most common defects in the prevailing diet of rice and fish. Metabolic studies with such rice-and-fish diets in which the bones were discarded showed that the subject suffered from a negative calcium balance. However, when 70 gm. of small whole fish (bones included) was added to the diet with its typical calcium deficiency, the dietary calcium was augmented by 577 mg. (average), of which calcium 70 per cent was retained. The phosphorus content of the diet was also increased by an average of 673 mg., of which one half was retained. This calcium retention percentage is at least double the amount reported by Robinson,[7] who states that only from 15 to 35 per cent of calcium is utilized by adults ordinarily.

Wide personal observation and inquiry have disclosed the biologic fact that there appears to be a definite correlation between an unusually sound and resistant set of teeth and a dietetic history of a craving for and eating of all the softened ends of bones that were edible, such as the ends of chicken bones and spare ribs, with all the "gristly" parts of meat that could be readily masticated. Such correlation has been found to occur almost without exception in elderly persons who have retained their teeth until late in life, relatively free from caries. The same correlations have also appeared to hold true for younger persons, from adolescence on through the years; but the elderly, with their life-long freedom from caries, have given the most conclusive evidence.

When it is considered that the "edible" bone thus ingested contains up to 350 parts per million of fluorine or perhaps even more, in addition to a very high calcium and phosphorus content, it would require only about 3 or 4 gm. of such bone to provide 1 mg. of fluorine per day as a supplementary ration. This is the equivalent of the fluorine content of about 2½ quarts of milk, or of that contained in about 5 glasses of drinking water fortified with 1 part per million of fluorine, the approximate amount needed daily, according to estimates made, for rendering the teeth comparably immune to dental caries. Furthermore, the calcium-phosphorus analysis of bone indicates that 4 gm. of bone will provide almost as much of these vital mineral elements as is contained in 1 quart of milk, thus revealing its milk replacement value in the diet where the calcium-phosphorus level is low.

In a U. S. Public Health Service

bulletin,[3] the fluorine analysis of animal products reveals the fact that "soup-bone" yields 93.9 parts per million of fluorine, while "cooked bone" contains 367.0 parts per million. The high nutritive value of such soup-bone has been universally known throughout the ages, although the fluorine content has apparently been overlooked until scientific analysis disclosed its abundant presence. The almost universal ingestion of such high-fluorine-content soup with nothing but physiologic benefit must clearly indicate the true food value of such fluorine as is found in bone, in the combinations of and relative proportions to the other contained elements which Nature has thus prescribed for safety.

It is further reported that various hospitals now "pressure cook" the soup-bones until they become so soft that they may be readily mashed with a wooden spoon. Such softened bones, made "edible," are fed to run-down patients in combination with the soup, with a resultant unusually rapid recovery in many instances. This further verifies the stimulating and nourishing value of fluorine when it is utilized according to "Mother Nature's" own plan. Yet certain authorities still maintain that fluorine is "toxic" in any combination, from any source.

The foregoing data have been presented in considerable detail to indicate the superior value of bone as a basic source of fluorine-calcium-phosphorus mineral nutrition for human usage today, for the preservation of not only the teeth, but also the health of the entire skeletal system.

As a means of supplying "edible" bone suitable for human nutrition, three basic procedures may be suggested: 1. The direct preparation of fresh macerated bone, supplied directly by the dealer from whom we obtain our meats; such bone being mixed with ground meat or in other desirable combinations before cooking. 2. Dehydration and sterilization of clean fresh bone, to be thereafter ground into powdered form and packed for human usage, as with "canned" foods. 3. The utilization of the bone-meal byproduct of the gelatine manufacturer, a degelatinized, finely ground bone-meal that is now produced to the extent of thousands of tons a year. This bone-meal byproduct, commercially known as dicalcium phosphate prepared from bone, is diverted almost exclusively now to the producers of cattle as a highly nutritious mineral concentrate.

This degelatinized bone-meal product is finely ground, clean, pure and stable, apparently an ideal preparation for meeting present requirements for a combined calcium-phosphorus-fluorine mineral supplement, systemically ingested as a "food," not as a drug. The fluorine content averages between 200 and 250 parts per million consistently, about one-third less than untreated bone, owing to the loss of such content in the wash water during processing. However, this loss of fluorine appears to be of little consequence, as there is an abundance of this element remaining to meet all systemic needs, as the foregoing percentage would indicate. In calcium and phosphorus content, these elements appear to remain virtually the same as in the untreated natural bone.

From 4 to 5 gm. of this product provides approximately 1 mg. of fluorine, together with about the same amount of calcium and phosphorus as is contained in 1 quart of milk. Thus, in one teaspoon of such "bone-food" supplement, there is provided a maximum of all three elements needed by either the growing child or the adult, irrespective of those derived from other available sources, such as milk.

Accordingly, in such a complete and comprehensive mineral food supplement, this calcium-phosphorus-fluorine ration in a naturally balanced form may be readily "fitted" to the individual needs, in conformity with the scientific principles followed in the administration of

drugs. In this therapy, however, we are administering a safe and natural fluorine bearing food—a highly vitalized mineral food prescribed by Nature—instead of dealing with an uncertain inorganic chemical such as sodium fluoride represents.

When the meager data relating to fluorine are pieced together, it appears obvious that any systemic fluorine therapy cannot be a complete success in dental caries control, without due consideration of that "balancing" element, calcium, which neutralizes the toxic nature of fluorine through chemical union, thereby creating such highly resistant fluorinized calcium salts as can be found in caries-resistant enamel.

Neither can a systemic calcium-phosphorus therapy alone offer any hope of dental caries control without consideration of that reciprocal, calcium-binding element, fluorine. Thus, as evidence of what a deficiency of the fluorine factor may do when an abundance of calcium and phosphorus is available, one may point to the failure of milk and the various synthetic calcium-phosphorus preparations to control dental caries when the fluorine element is lacking.

With the calcium-phosphorus-fluorine therapy now available, balanced physiologically as well as chemically to meet the needs at hand, let us attack the dental caries problem at its systemic base, through working in direct harmony and cooperation with biologic principles and laws. Let us thus seek to wipe out, through simple and natural means, the most prevalent of all the diseases that afflict civilized humanity today, dental caries.

CONCLUSIONS

The fundamental value of fluorine for protecting teeth against caries has been well established. Although the exact etiology of such protectiveness remains somewhat obscure, sufficient data are available to justify the judicious use of fluorine, particularly in combination with calcium and along Nature-prescribed lines. The calcium-fluorine-phosphorus combination as found in bone meets practical requirements in a safe and simple manner.

In the final analysis of the dental caries problem, it might be stated that a decayed tooth is a starving tooth, starving for certain mineral elements of a protective nature which the saliva should normally supply, particularly calcium, phosphorus and fluorine. The saliva, in turn, must depend largely on an adequate systemic reserve of those essential minerals which are needed for tooth protection against oral acids, etc. In the absence of such systemic reserve, the salivary function must necessarily lose much of its neutralizing and remineralizing power, with dental caries tending to ensue thereafter.

The storage of large amounts of fluorine combined with calcium and phosphorus in normal bone clearly indicates that such fluorine is an indispensable factor in the construction and stability of all bony tissues of the body. The relative proportions and combinations thus involved in normal bone construction provide a clear and definite "index" to the approximate bodily requirements of such vital elements when ingested through food or drink.

Nature appears to have ordained bone as well as flesh for food of virtually all meat-eating creatures including man, who seems to have largely failed to perceive its potential physiologic value in the modern civilized diet. The high state of animal nutrition relative to general body structure, bone development, soundness of teeth, etc., bears mute witness to the nutritional benefits which the balanced mineral elements in bone may thus impart.

Let us now seek to so fortify our own mineral nutrition through those naturally combined elements named above

that sound and resistant teeth may be the "rule" of the future, rather than the exception, as at the present time. Nature has indicated the approach to such nutrition. Let us give this strictly "natural" plan a fair and thorough trial under modern conditions of living.

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EXTRA-ORAL PLASTER SPLINT FIXATION IN THE TREATMENT OF FRACTURES OF THE MANDIBLE

JULIUS G. GODWIN, D.D.S., Houston, Texas

THE diversity of opinion relative to treatment of fractures of the mandible by extra-oral fixation indicates that no one method has been entirely adequate. In spite of the arguments in favor of intra-oral fixation methods, the fact remains that, in certain cases, this method of treatment cannot be employed.

Extra-oral fixation of jaw fractures by means of vitallium screws and plaster splint, as suggested by Julius Bourgoyne,[1] of Charity Hospital, New Orleans, was undertaken in a number of cases. Dr. Bourgoyne's technic was followed, with some deviations of our own. Subsequently, four cases will be reported in which the use of this type of fixation was particularly useful.

From the Dental Department, Jefferson Davis Hospital.

1. BOURGOYNE, JULIUS: Extra-Oral Splinting of Fractured Mandible. J.A.D.A., 30: 1390, September 1943.

MATERIALS

The vitallium screw we use now is of the Venable type, 1½, 1¾ and 2 inches long, making allowance for the width of the jaw bone, subcutaneous tissue, skin and the plaster splint. The diameter of the threaded shank is equal to or very little greater than that of the bone drill. The shank of the screw should be fully threaded so that the plaster bandage and plaster will better engage itself on the screw.

The plaster splint consists of a 1 inch wide bandage, impregnated with plaster, which is wrapped around the screw shanks. It is reinforced with plaster, as shown in the accompanying figures. Rapid stone may also be successfully used as a splint.

PREOPERATIVE PROCEDURES

Anterior, posterior and lateral films are taken before the operation to check roentgenographically the position of the jaw fragments, the exact site of the fracture and the condition of the teeth.

The patient is carefully examined in order to rule out any symptoms that might make the operation inadvisable. One should also make sure that the tissues where the screws are to be placed are free from infection, hematoma and edematous swelling. A wait of a few days is suggested, until the edema has subsided (this is quite often necessary after any traumatic injury) rather than subjecting the patient to this type of operation. The fracture, however, should be reduced as much as possible and, at the earliest date, by some kind of fixation such as internal wiring or any other method available. Immobilization of the jaw fragments will help to make the patient comfortable and hasten reduction of the swelling. With little edema present, it will be much easier at the time of the operation to locate anatomic landmarks and to place the screws at the desired points. These points should be approximately from 5 to 10 mm. from the lower border of the mandible.

Fig. 1.—Schematic drawing of screws in place before application of plaster bandage and plaster or stone.

OPERATION

Preferably, pentothal sodium anesthesia should be employed in this type of work. The usual sterile technic as used in other operative procedures should be carried out. It was found best to have one operator work in the mouth while the other handled the extra-oral procedures.

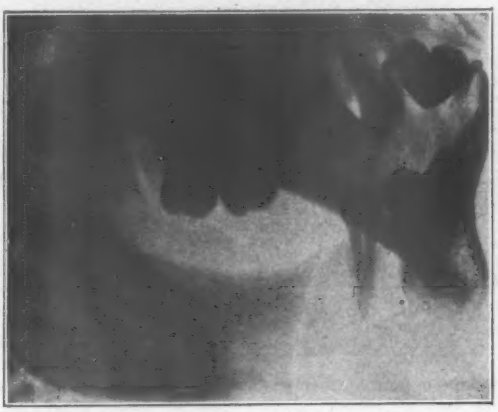

Fig. 2. (Case 1).—Lateral roentgenogram showing fracture of left side of mandible.

The face having been shaved preoperatively, if necessary, the skin is prepared by using any of the accepted skin disinfectants. It is well to mark on the

Fig. 3 (Case 1).—Lateral roentgenogram showing fracture of right side of mandible.

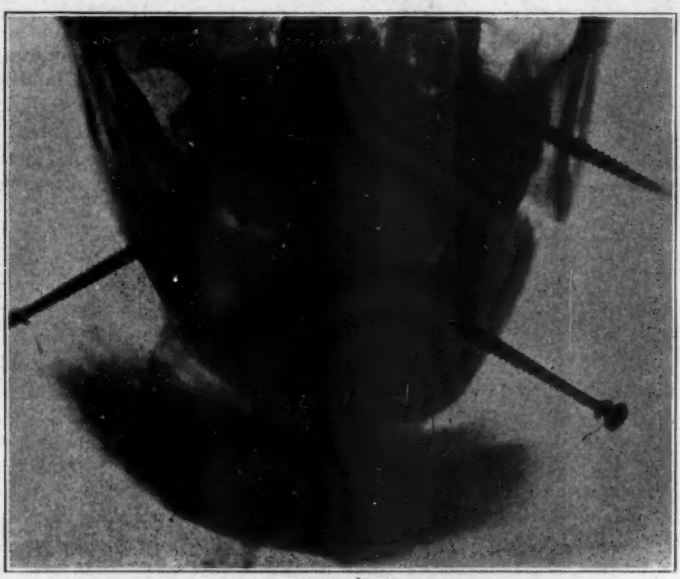

Fig. 4 (Case 1).—Anteroposterior roentgenogram showing fracture of right side of mandible.

skin the line of fracture and certain anatomic landmarks, such as the lower border of the mandible. A sterile hypodermic needle may be inserted through the skin to explore the fracture line.

A small skin incision is made at the desired points. The muscles and other subcutaneous structures are then divided to the bone by blunt dissection using a mosquito hemostat. A metal tube—just large enough to allow rotation of the bur and drill point—is placed in the incision wound, to prevent undue trauma.

The initial cut into the bone by a bur will guide and make subsequent drilling with the drill point easier. The drill

point, motor or hand driven, is held at an angle of approximately 70 degrees to the external surface of the jaw bone, so that, later on, the points of the screws will converge at approximately 40 degrees, and thereby more adequate fixation of the screws will be insured as a result of greater contact with the cortical plates. On its way through the jaw bone, the drill point will meet with greater resistance when going through the outer cortical plate. On reaching the marrow cavity, the drilling will be easier, but greater resistance will again be encountered in the inner cortical plate. Care should be taken not to pierce the mucous membrane of the mouth, to avoid contamination, or to injure the other operator's fingers. A knowledge of the anatomy of the jaw, including its thickness in various regions and the surrounding structures, is essential.

A screw of suitable length and diameter is inserted in the drill hole and secured in place by means of a screwdriver. The screw should cut its own thread as it is turned into the drilled hole, and should barely be felt through the mucous membrane of the mouth.

The screws having been securely anchored in the jaw bone, the jaw fragments are brought into alinement, either by wiring the teeth in occlusion or by attaching rubber ligatures to labial arch wires which have been previously applied. If immediate and complete reduction cannot be obtained by these procedures, it is advisable to apply rubber ligatures and to delay application of the plaster splint until occlusion is established by traction. If the jaw fragments cannot be controlled by any standard methods, such as are employed in fractures at the angle of the mandible when retention of the posterior fragment becomes difficult, or in fractures of an edentulous mandible, etc., the jaw fragments are alined by digital manipulation and held there until the plaster splint is applied and has set.

Fig. 5 (Case 1).—Photograph of patient with bilateral fracture of mandible (edentulous distal fragments) two days after splint had been applied.

Fig. 6 (Case 1).—Photograph of patient with bilateral fracture of mandible (edentulous distal fragments) two days after splint had been applied.

Compound tincture of benzoin may be applied to the skin surface prior to application of the plaster splint.

A 1 inch wide bandage roll impreg-

Fig. 7 (Case 2).—Lateral roentgenogram showing fractures of left mandible and symphysis.

Fig. 8 (Case 2).—Schematic drawing illustrating position of screws and splint.

Fig. 9 (Case 2).—Photograph of patient with splint in place.

nated with plaster of Paris, as used in bone surgery, is then prepared and wrapped around the free shanks of the screws. (Fig. 1.) Rubber band ligatures may be used around the screws to tighten the grip of the plaster bandage on the screws. Meanwhile, plaster is mixed to the consistency of putty and applied to the bandage to give the splint a smooth surface and to reinforce it. As mentioned above, the splint may also be made of rapid-setting stone.

POSTOPERATIVE CARE

Intermaxillary wires or rubber ligatures, if used, may be cut as soon as the plaster or stone has completely set. If there are no immediate postoperative complications, the intra-oral fixation may be continued for several days. This absolute fixation by both methods will allow a blood clot to organize undisturbed and furnish a bridge for later callus formation.

Several days later, soft diet may be substituted for liquid diet.

A thin coat of collodion may be ap-

plied to the entire surface of the splint after it has been allowed to harden sufficiently.

REMOVAL OF PLASTER SPLINT

In removing this fixation device, it may be practical to cut the splint in several fragments with the help of surgical burs and safe side disks, before attempting to dislodge the screws. An isotonic saline solution is then injected through a cannula into the tracts left by removal of the screws.

Fig. 10 (Case 3).—Anteroposterior roentgenogram (splint applied). The screw in the ramus gave evidence of marked loosening six weeks after the reduction of the fracture. In order to avoid electrolytic action between screws placed in the jaw bone, the use of any connecting metal bar or wires was omitted in later cases.

COMMENT

We have never had any untoward reactions to the vitallium screws in the jaw bone, nor has osteomyelitis ever developed about the screws. It may be assumed that an infection would be due rather to the presence of bacteria, carried into the bone by the screws, than to a "foreign body reaction." A small amount of seepage was noticeable about several screws, a condition which is not to be confused with actual infection about the pin sites.

An important consideration in using this appliance is cleanliness. In a few cases, it was noted that the area underneath the plaster splint became unclean and unsanitary after several weeks. This was particularly true where the plaster was very close to the skin surface. However, it was found that for cleanliness much depended on the patients.

In order to avoid electrolytic action between screws placed in the jaw bone, the use of any connecting metal bar or wires was omitted in all later cases.

An advantage of other skeletal fixation methods over this one can be seen in the fact that adjustments can be made after the fracture has been reduced. In many cases of jaw fracture, however, especially if satisfactory occlusion can be obtained, no adjustment should be neces-

sary, once the fracture has been reduced.

REPORT OF CASES

CASE 1.—*History.*—M. W., a colored woman, aged 27, was admitted to Jefferson Davis Hospital with a bilateral fracture of the mandible sustained the day before. The past history was irrelevant.

Examination.—Roentgenograms and clinical studies revealed a compound fracture of the mandible in the region of the right second molar, the crown of this tooth having been severed from its roots. The distal jaw fragment was displaced upward and slightly inward. On the left side of the mandible, there was a simple fracture through the first molar area, with good

Fig. 11 (Case 3).—Photograph of patient with splint in place (adhesive tape applied over splint).

alinement of the fragments. (Figs. 2 and 3.) All teeth back of the bicuspids were missing on both sides of the mandible except for the second molar on the right side, which was broken in two. All results of laboratory tests were irrelevant.

Operation.—No facilities being available for construction of a splint which could have been used for circumferential wiring, the extra-oral fixation method above described was employed. (Fig. 4.)

Course.—The postoperative course was uneventful. There was some swelling of the face during the first few days. (Figs. 5 and 6.) Some trismus of the cheek muscles was present at first, as is frequently true in fractures at the angle of the mandible. One week after reduction of the fractures, the roots of the right second molar were removed under local anesthesia. Union of both jaw fractures progressed without complications. The patient was able to eat a soft diet and experienced little discomfort from appliance of the splint. Seven weeks after the injury, the screws and splint were removed. It was found that, except for the screw in the right distal fragment, all screws were reasonably tight in the jaw bone.

CASE 2.—*History.*—C. G., a man, had been hurt in a fight, May 6, 1943, sustaining two compound fractures of the lower jaw, one in the symphysis region, the other in the left first molar region. (Fig. 7.) The past history was irrelevant. There had been the usual childhood diseases. A "skin cancer" was removed in 1932 and appendectomy performed in 1937.

Examination.—The first molar on the left side was missing and the second molar had a slight mesioversion. The oral hygiene was poor and stain, calculus and caries were present. The hematologic findings, urinalysis and Kline and Kolmer reactions were negative.

Operation.—Both fractures were reduced by intermaxillary wiring, May 6. In the next few days, the patient complained very much of the wires and the discomfort of being unable to open his mouth. He readily agreed to an operation when told about the splint method, to immobilize the jaw fragments and permit at least a soft diet.

May 11, under pentothal sodium anesthesia, the jaw fragments were immobilized by extra-oral fixation, using five screws and the plaster splint. (Figs. 8 and 9.) The intermaxillary wiring was used as a guide in securing the correct occlusion.

Course.—During the first forty-eight hours after the operation, considerable swelling was noted on the left side of the face, but it decreased rapidly in the next few days. The patient was able to eat a soft diet and had no complaints except for an occasional vague pain in the region of the left jaw fracture. Daily irrigation with a physiologic solution of sodium chloride was carried out. Prophylactic doses of sulfa-

Fig. 12 (Case 4).—Anteroposterior roentgenogram showing fracture of mandible through symphysis.

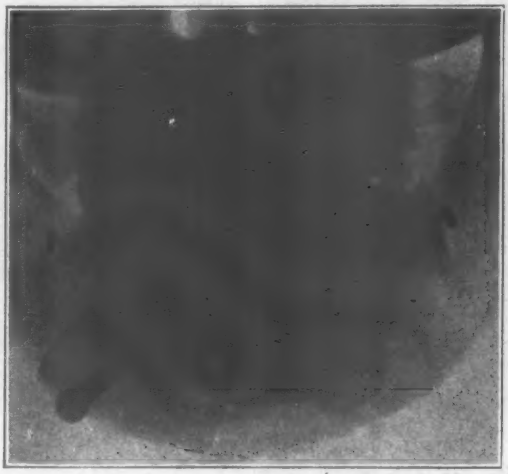

Fig. 13 (Case 4).—Anteroposterior roentgenogram showing splint and heavy labial arch wire applied.

thiazole were administered by mouth as long as was deemed necessary.

June 2, the patient left the hospital. He was seen occasionally during the next five weeks, and boasted of "eating tender steaks whenever he could get them." July 6, the splint and screws were removed. Four of the screws were almost as tight as when placed. Only one screw to the right of the symphysis fracture was loose.

CASE 3.—*History.*—J. J., a colored man, aged 38, first seen at the Emergency Clinic of Jefferson Davis Hospital, May 8, 1943, complained of severe pain on opening and closing his mouth. The night before, he had been hit on the jaw, but had paid little attention to the injury at the time. The past history was irrelevant.

Examination.—Intra-oral examination revealed limited opening of the mouth and a compound fracture of the mandible back of the second molar on the right side.

Anteroposterior and lateral jaw roentgenograms revealed a comminuted fracture of the mandible in the region of the right third molar. The third molar was not present. The distal jaw fragment was pulled upward and inward. All results of laboratory tests were irrelevant.

Operation.—Owing to the presence of a large bridge extending from the upper left lateral incisor to the upper left second molar, intermaxillary wiring was impracticable. Furthermore, since the posterior fragment could not be well stabilized by simply wiring the teeth in occlusion, extraoral fixation was resorted to.

Under sodium pentothal anesthesia, a screw was placed in the right ramus about one-quarter inch above and mesially from the angle of the mandible. Another screw was placed between the first and second molar on that side. The jaw fragments were brought into alinement by digital manipulation and held there until the plaster splint was applied and had set. (Figs. 10 and 11.)

Course.—In the next few hours, there was considerable swelling of the face on the side of the fracture. The temperature rose abruptly from 98 to 102.3°. During the following days, the edema gradually subsided and the temperature dropped to normal.

Intra-orally, on the mucous membrane of the lingual aspect of the right ramus, approximately at a point where the tip of one screw was situated, an ulcer developed soon after the operation and, in a short time, the bone was exposed at this spot. The tip of the screw could be barely palpated. Granulation tissue soon filled in where the bone was denuded and an uneventful healing of the mucous membrane took place.

For the next two weeks, the patient had no complaints and enjoyed a soft diet. Then, one morning, he became alarmed because of pain in the right ear and right eye, which showed small petechiae of the conjunctiva. Examination by the eye, ear, nose and throat specialists revealed no pathologic changes. It was believed that the symptoms were reflex, particularly when they disappeared soon afterward.

About four weeks after the operation, the screw in the ramus began to loosen. June 22, the screws and plaster splint were re-

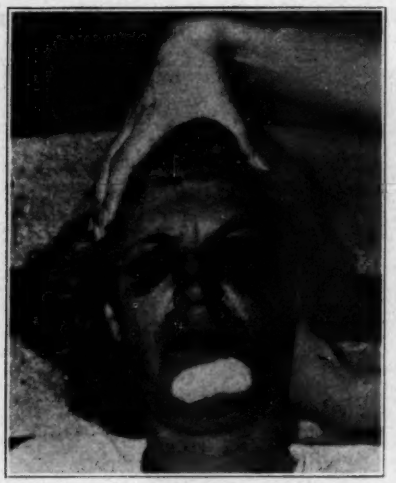

Fig. 14 (Case 4).—Photograph of patient one day after splint had been applied, showing facial lacerations and ecchymosis of eyelids.

Fig. 15.—Applications of splint to fracture of left mandible (between second bicuspid and first molar), in which there was considerable upward and lingual displacement of distal fragment. All upper teeth back of the cuspids were missing on both sides.

moved. There was evidence of union of the jaw fragments from a clinical standpoint. The screw which had been placed in the ramus was loose, whereas the screw in the body of the mandible was still reasonably tight in the jaw bone.

CASE 4.—*History.*—B. S., a white woman, aged 40, admitted to Jefferson Davis Hospital with a fracture of the symphysis menti May 29, 1943, stated that she had been hit on the head and face the night before.

Examination.—Roentgenograms revealed a compound fracture of the mandible in the incisor region. (Fig. 12.) The bones of the skull were reported intact by the radiology department. There were lacerations of the left cheek and left temporal region, ecchymosis of the eyelids and petechiae of the conjunctival membranes.

Both the Kline and Kolmer tests showed a ++++ reaction. The Venereal Disease Clinic classified the patient as a latent syphilitic. Other laboratory tests were insignificant.

Operation.—Since most of the upper teeth were either missing or badly broken down and painful on palpation, intermaxillary wiring could not be used for reduction and immobilization. As it was also noted that most of the lower teeth were markedly loose, it was decided to apply a heavy labial arch wire to the remaining lower teeth in addition to extra-oral fixation. May 29, the operation described in this paper was carried out. (Figs. 13 and 14.)

Course.—For the next four days, the patient had a septic temperature curve. Sulfathiazole was administered by mouth. Headaches and restlessness were marked. Vague pain was experienced in the left temporal region. There was comparatively little swelling, with no pain, in the region of the reduced fracture.

As the temperature dropped to normal, the general condition of the patient improved. She then complained of numbness in the left cheek, which might have been caused by trauma to some of the fibers of the fifth nerve when she was injured. The jaw in the region of the symphysis felt solid. Syphilitic treatment was continued, 1 cc. of bismuth subsalicylate being administered once a week.

By the middle of June, the numbness had gone from the left cheek and the patient complained only of occasional pain somewhere in the face, she did not know "exactly where."

By the end of June, the area underneath the splint was unclean and unsanitary. The skin was irritated.

July 9, the screws and the splint were removed. The screw on the right side of the symphysis fracture was firmly embedded in the jaw bone, whereas the screw on the left side was somewhat loosened. Good fibrous union of the jaw fragments was noted.

The drill hole wounds and the irritated skin healed quickly without complications. The labial arch wire was left on for two weeks after removal of the splint.

PROTECTING THE PULP IN DECIDUOUS AND YOUNG PERMANENT TEETH

EUGENE J. NORTH, D.D.S., Buffalo, N. Y.

THE finest in dental service, especially in reaching toward the Utopia of practicing preventive dentistry, can be attained only by striving for protection of the pulp. The pulp, if I may remind you, is composed of nerve tissue, blood vessels, lymphatic vessels, connective tissue and cellular material, and its function is twofold: 1. It is the formative organ of the dentin and also serves to nourish it. 2. It is the sensory portion of the tooth.

It is well to note here that the deciduous pulp chamber is comparatively larger and there is less tooth structure protecting the pulp than in a fully developed permanent tooth. We must also remember that the pulp chamber of the young permanent tooth is considerably larger than in the completely developed tooth. The odontoblasts, or dentin-forming cells, continue to lay down primary dentin until the tooth is completely developed. After this, the action of the odontoblasts becomes limited and only through irritation, chemical, thermal or traumatic, or that caused by decay or other abnormal conditions, are these cells stimulated to form secondary dentin. The formation of secondary dentin is Nature's method of protecting the pulp in abnormal conditions present in the hard structures of the tooth. We all know that the source of irritation is often the filling materials used in correcting a pathologic condition present in the enamel and dentin. It is my belief that the less change there is within a tooth after a filling has been placed, the closer we are to reaching the ideal in dental restoration.

In aiming toward this ideal in pulp protection, we must routinely: (1) protect the pulp from pain; (2) protect it by sterilization, and (3) protect it from irritation by the filling materials used.

We all strive for perfection in restorative work, and this striving naturally begins with the preparation of the cavities. It is certainly essential that every bit of decay be removed and the best possible preparation be made. In order to do this, we must protect the pulp from pain. The method I like best is local anesthesia.

Unless perfect cooperation is obtained at all times during operative procedures, one is unable to procure the desired results. No one expects a jeweler to repair a watch while it is in motion, yet a dentist, who is doing a more difficult job, is often expected to operate with the patient's head any place but where it should be. One author, in justifying the use of cements for restorative work in children's mouths, stated: "For patients who are difficult in the chair or who will not allow the dentist to prepare a cavity for a metallic filling, cements will protect the pulp."

I do not wish to go into the subject of patient management, but I do want to say that I feel definitely that there should be no such patients except the mentally deficient. The type of child referred to here can be trained and, by use of anesthetics, cooperation can be secured in preparing cavities for metallic fillings. All children deserve good dental

Read at the Seventy-Ninth Annual Midwinter Meeting of the Chicago Dental Society, February 23, 1943.

service. They are often taken advantage of in the dental chair, either because the operator believes he can make a preparation or perform an extraction quickly or because he is afraid to give his young patient an injection. Because of these facts, the patient is often hurt unnecessarily and soon dreads a visit to the dentist. I believe that we would all enjoy much of our work a great deal more if we could limit our practices to operative procedures on pulpless teeth. Why not do the next best thing and work on anesthetized teeth?

As the technic for local anesthesia has been widely discussed in the literature, I will go over my procedures briefly. It has been my experience that it is always best to explain the use and purpose of the syringe to the young patient. The best way to gain his confidence is to deal frankly with him. The syringe (my patients know it as a watergun) is loaded with a partly used carpule of procaine, a drop of which ("sleepy water" to the patient) is placed on the end of the dentist's index finger. After the young patient is shown how it works, we can ask if he would like a drop on his finger. Usually, he will present his finger for demonstration. However, there are a few who refuse. In the latter case, the issue is not forced, but the refusal is accepted in a matter of fact way, and the syringe is placed on the tray. This demonstrates the use of the syringe.

A sterile syringe is now placed on the tray and we are ready to proceed. For a painless injection, I first dry the tissue in the area to be injected and then apply a topical anesthetic. Next, I make sure that the tissue is taut. This is done by gently but firmly pulling the cheek in the area to be injected. The same procedure is used in tuberosity injections. In the lower jaw, in which I use conduction anesthesia exclusively, I have the patient open his mouth as widely as possible. I explain that the wider he opens the mouth, the easier it is for both of us. At this point, may I repeat the old, old story that a sharp needle is essential.

Many of us may have found that we most fear injection in the young patient in conduction anesthesia in the lower jaw. This fear can be overcome by making the original insertion with the syringe parallel to the occlusal surfaces of the teeth and then placing a few drops of solution on the lingual nerve. At this point, we can carry the syringe to the proper angle for completing the injection and as we do, we place the left index finger underneath the barrel of the syringe so that it may act as a tongue depressor and no undue strain is placed on the needle. For this injection, I use a solution affording a short period of anesthesia and find that one c.c. is ample. When infiltrating, I use a more potent solution, but again keep the amount at a minimum. With children, I always try to cut down the period of anesthesia in order to prevent lip or tongue biting after the patient leaves the office. This is controlled by the amount and type of solution injected. When a child leaves the office and anesthesia is still present, a cotton roll is placed in the mouth and the patient is told to bite on it for at least twenty minutes or until the lip and tongue have awakened.

The next phase of pulp protection is sterilization. I use two methods, both of which are universal, but with a variation in technic that might be helpful. Eighty-five per cent phenol is used in all cavities where the cavity preparation is in sound dentin that is not discolored. The tooth is always isolated with cotton rolls, the cavity dried and the phenol applied. The phenol is allowed to remain for at least three minutes, after which the excess is removed and the cavity dried with air. It may be of interest to note here that I do not follow the phenol application with alcohol, primarily because the action of the phenol is counteracted by that of alcohol and thus its value as a sterilizing agent is greatly reduced.

The second method used is ammoniacal silver nitrate reduction. This method is used when the cavity preparation is on sound but discolored dentin. I emphasize sound dentin because, with many others, I believe that the actions of silver nitrate are limited and that all decay should be removed from every cavity. The material is an excellent one in its place, but it is not a cure-all. It must also be remembered that areas of decay treated with silver nitrate under a restored area are just as radiolucent as decay areas that have not had such treatment. I am sure that when the roentgenogram shows radiolucent areas under fillings, none of us is satisfied to leave them and simply hope that some one has sterilized the area of decay by silver nitrate reduction. Ammoniacal silver nitrate reduction is a favored method of sterilization in my office especially in young permanent molars where extensive decay is present and the remaining dentin is sound but discolored. In its use, however, there are two things that should be guarded against: (1) discoloration of the tooth and (2) irritation of the pulp.

Although the discoloration due to silver nitrate reduction has no harmful effect upon the tooth, it is very unsightly and displeasing to the child, the parent and the operator. With proper control, this undesirable characteristic of the material can be overcome.

Silver nitrate, as well as other potent medicines, should never be carried to cavities on pledgets of cotton or by foil carriers or ball burnishers. With these methods, one has little control either of the amount carried or of its placement. Injuring surrounding gum tissue or getting caustic solutions on lip, tongue and cheek is not uncommon with the above-mentioned practices. The results are frequently harmful and often embarrassing.

It is well to have a small medicament tray that is used only for ammoniacal silver nitrate and its reducing agent. A drop of each liquid can be placed in separate parts of the tray and we are ready to proceed. The tooth is now isolated with cotton rolls and the prepared area is thoroughly dried. To prevent discoloration, we must have control of the amount of solution and its application in the cavity. The only part of the material which interests us is that penetrating the discolored dentin. Therefore, all we need is a thin layer covering this area. It is not necessary to flood the cavity. If we just touch one end of a double-ended concave instrument to the drop of solution placed in the tray, we find that a small amount attaches itself and that it will remain until touched to the spot where we wish it to be. In young permanent and deciduous teeth, I allow it to remain approximately three minutes. Then, taking the other end of the instrument, we apply eugenol, which counteracts the irritating properties of the ammoniacal silver nitrate. I allow the eugenol to remain approximately three minutes and then take up the excess with a dry pledget of cotton. The side walls, which one must be careful to keep free of silver nitrate, are now sterilized with phenol, and I proceed with the next step in pulp protection.

The use of sedative lining materials is the third essential link in the chain of pulp protection. Let me repeat that since there is comparatively less tooth structure protecting the pulp in deciduous and young permanent teeth, greater precautions must be taken to protect the pulp. One of the greatest difficulties in dentistry for children has been the death of the pulp following restorations. This, I believe, can be prevented by the use of sedative protective materials.

One of the most satisfactory and most used materials that I have in my office is plain zinc oxide and eugenol. This substance is widely used as a temporary filling and toothache remedy, but I believe that it has much greater possibilities. It

has some undesirable characteristics which have limited its use in a cavity: (1) it sets too slowly and, after being placed in a cavity, it spreads over the mouth when the cotton rolls are removed; (2) it does not get hard enough, and (3) upon settling, it becomes flaky and difficult to work.

The characteristics in its favor are based on the properties of the materials themselves. Eugenol, an essential oil, is sedative and slightly antiseptic. Zinc oxide is also slightly antiseptic. Therefore, i.e. because they are both protective and soothing, I believe that zinc oxide and eugenol and analogous materials are best for pulp protection where the cavity is close to the pulp chamber. Thoma,[1] under the heading "Pathologic Effects of Dental Restorations," reviews the research on the effect of filling materials upon the teeth, by Manley (1936), Palazzi (1923), Fasol (1924), Rohrer (1924), Hill (1934) and Wustrow (1922). All of these men found that reaction to the use of silver amalgam was evinced in secondary dentin of considerable thickness. The reaction to the use of germicidal cements such as copper oxyphosphate was seen in the pulp, with resultant injury to the odontoblasts and deposition of atubular dentin. The irritating effects of these and of the oxyphosphate cements in general are due to the phosphoric acid in the fluid with which the cement is mixed. The use of silicate cements had a marked effect upon the teeth. The odontoblasts were not only stimulated to action, but were irritated to the point of destruction of these cells. This tends to prove that pulp death can result from the use of silicate fillings without a lining as protection. Thoma states that Hill (1934) questions whether it is a result of caries so close to the pulp that the infection could not be completely eliminated. Since 1932, I have examined thirty clinical cases of pulp devitalization in young anterior permanent teeth and in only two was decay present under the fillings. In none of the cases that I examined was the cavity lined with cement of any type. Whether a varnish was used was not discernible. The younger the tooth, the shallower the filling causing pulp necrosis.

The fourth material used in the abovementioned experiments was zinc oxide and eugenol. Thoma states: "No appreciable reactions could be detected; there was no deposit of adventitious dentin or reaction in the pulp and the result was the same if the cavity was lined only with zinc oxide and eugenol and filled with amalgam or porcelain cement."

I have now established the value of zinc oxide and eugenol as the best materials for pulp protection, in order to so repair a tooth as to give it a maximum lifetime. Previously, I mentioned their shortcomings, and I now shall endeavor to point out a few ways of overcoming them.

The mixing of zinc oxide and eugenol is quite simple and no definite technic need be followed. The materials are mixed until the resulting substance is as stiff as possible. We now have from a practical point of view an almost worthless material, used chiefly to stop toothache and probably not the best means of doing that. However, by placing this material in a number of thicknesses of paper napkin and expressing it as hard as possible, we obtain another useless mass. This substance is now placed in a piece of rubber dam approximately 2 inches square and is triturated for a short time between the thumb and index finger. The result will be an excellent, workable material, which can now be used for the desired purpose. This material still has limitations in that it does not set quickly enough to place an amalgam filling over it immediately. However, I have found this no great drawback.

1. THOMA, K. H.: Oral Pathology, St. Louis: C. V. Mosby Co., 1941, pp. 502-503.

In the children that I see, I often find that if a distoclusal cavity is present in the first deciduous molar, a mesioclusal cavity is to be found in the second deciduous molar. If the first molar has erupted, we frequently find the occlusal fissure ready for correction. In these cases, I find that, by anesthetizing an area, for example the inferior right maxillary area, I am able to prepare two or three cavities with a maximum of cooperation from my young patients and sterilize the cavities and fill them with the zinc oxide and eugenol. This material will hold up admirably and, at a subsequent sitting, the work is completed by applying the zinc oxide and eugenol and placing the desired alloy fillings. This material is hard enough to permit condensation of the alloy over it. However, there are times when a single large cavity is present within an injection area and I feel that I can safely complete it in one session if a sedative material can be used.

If the cavity is a large one, in which there is sufficient dentin to protect the pulp and enough working depth, I first sterilize the cavity and then place a small amount of zinc oxide and eugenol prepared in the above-mentioned manner over the pulp wall. The cotton rolls are now removed and the cavity is allowed to become moist. This hastens the setting time of the zinc oxide and eugenol, but not sufficiently to permit condensing alloy over it. After a few minutes, the tooth is again isolated, the walls are sterilized with phenol and a mix of zinc oxyphosphate cement is placed over the sedative lining. This can be followed by the silver alloy restoration.

Large Class III cavities in young permanent anterior teeth call for a lining that has no irritating properties if the best pulp protection is to be given. Young permanent anterior teeth—and by young I mean those in which the primary dentin has not as yet been completely deposited—should have that little extra care in pulp protection. The times when a synthetic porcelain filling will not require a lining are rare and should be even more so in young teeth. I prefer zinc oxyphosphate cement fillings, which I am not in favor of, in these teeth rather than unlined synthetic ones, because the findings previously mentioned are, to my mind, proof that synthetic porcelain is a sufficiently injurious material to cause death of the pulp.

In my practice, I have discontinued the use of the varnish-type lining materials so often used in anterior teeth. Do not misunderstand—I am not condemning them, but I like to use a material that I can see. To satisfy my own conscience, I like to use zinc oxyphosphate cement properly mixed. Proper mixing is accomplished by using a cool slab, taking only small amounts of powder into the liquid at a time and mixing it slowly and over a large area on the slab. This method liberates a maximum amount of the free acid, making it less irritating, and gives a less sticky, slower setting and harder cement. I can see exactly where the lining material is, and I am sure that the pulp wall is covered and that none of the material is remaining on the margins of the cavity. These materials are also beneficial since they are distinguishable in roentgenograms.

To summarize: Because of the morphologic variations between deciduous and young permanent teeth and those of fully developed permanent teeth, it is believed that the former need added care and protection. The more shallow caries in these teeth must receive the same precautionary measures as extremely deep caries in the latter. Decay has no place in any form under any filling. Its removal often necessitates pulp protection to avoid pain. For this reason and others, anesthesia should be used more often.

Second, sterilization is absolutely essential before placement of fillings. However, we have no material which over-

comes the evils of decay. If the sterilizing agent were ideal from the point of asepsis, we still could not be sure that the odontoblasts and the pulp chamber were already involved.

Third, because the pulp chamber has less tooth structure protecting it, there is a greater need for materials that are non-irritating to the tooth. Those that have a soothing and protective effect, such as zinc oxide and eugenol, answer this need admirably if the proper technics are followed.

143 Bryant Street.

EOSINOPHILIC GRANULOMA OF BONE WITH MANIFESTATIONS IN THE JAW

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EOSINOPHILIC granuloma of bone was described by Otani and Ehrlich[1] as a definite entity and by Lichtenstein and Jaffe[2] as a benign granulomatous lesion of bone, characterized by the presence of many eosinophils. The following case is one of unusual interest to the oral surgeon because it is another instance of primary disease of bone, which may, as in this case, first be suspected on routine dental examination.

REPORT OF CASE

History.—C. L., a soldier, aged 21, was admitted to hospital because of sudden paralysis of the left side of the face. The paralysis cleared almost completely in a few weeks, and the patient was discharged with the diagnosis of Bell's palsy. He was again admitted to hospital one month later because of attacks of vertigo with falling to the right. At this time, he also noted pain and a tender area between the shoulder blades. The past and family histories were essentially negative.

Examination.—The physical examination was negative except for missing teeth and an area of tenderness over the upper dorsal vertebrae. Urinalysis revealed a specific gravity of 1.020, no albumin or sugar and a negative sediment. No Bence-Jones protein was found. The red cell count was 4,400,000; hemoglobin, 90 per cent; white count, 9,000, with 62 per cent neutrophils and 1 per cent esoinophils. The sedimentation rate was 17 mm. per hour. The serum protein was 6.6 per cent; the albumin, 3.9 per cent, and the globulin, 2.7 per cent. The blood calcium was 10.4 mg. per cubic centimeter and phosphorus 4 mg. per cubic centimeter. The phosphatase was 2.8 Bodansky units. The serum cholesterol was 145 mg. per cubic centimeter.

Roentgenograms of the skull revealed a sclerotic mastoid on the left. Immediately posterior to it, there was a punched-out area of rarefaction in the left parietal bone. However, inspection of the left ear drum revealed a normal tympanic membrane. A diagnosis of Meniere's syndrome, due to neuritis of the cochlear division of the left auditory nerve, was made. A focus of infection was suspected, and, for this reason, the patient was referred to the oral surgery section for dental examination.

The clinical appearance of the mouth was grossly normal. Twelve teeth were absent as a result of previous extractions, the last two years ago. Routine dental roentgenograms revealed two areas of rarefaction in

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the mandible, one at the apex of the right central and lateral incisors, measuring 1 cm. in diameter, and the other extending from the second molar to and including the central incisor on the left, measuring 3 by 2 cm. There were punched-out areas of complete rarefaction, with relatively smooth, but occasionally ragged borders and no surrounding periosteal reaction area. (Fig. 1.) Two similar lesions were also seen in the maxilla. (Fig. 1.)

Fig. 1.—Areas of eosinophilic granuloma in mandible and maxillae.

Fig. 2.—Body of left side of mandible, showing invasion of inferior dental canal by granulomatous process, with resulting destruction of canal wall.

Operation.—Under local anesthesia, with 2 per cent procaine and 1:50,000 epinephrine, the lower right central and lateral incisors were extracted by the open method and a general débridement was performed. The interdental bone above the lesion was of normal appearance. Beneath it lay a yellow caseous material about 2 mm. thick which was easily curetted out. Below the caseous material, there was a grayish granulation tissue containing a gelatinous material, which made up the contents of the rarefield area seen in the roentgenogram. This was excised. The mandible in this area was completely destroyed from labial to lingual aspects including the periosteum. The wound was packed with sulfanilamide powder and an iodoform gauze wick was inserted.

Course.—Ten days later, the area in the left mandible was curetted after extraction of the lower left cuspid and first bicuspid. The bone in the region of the mental foramen was completely destroyed, the anterior portion of the inferior dental canal lying exposed. The canal back of this area was larger than normal (Fig. 2) owing to bone

Fig. 3.—Widespread destructive lesions of eosinophilic granuloma in ribs and vertebrae.

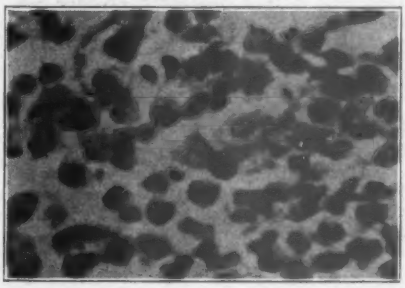

Fig. 4.—Section of material curetted from mandible; showing great numbers of eosinophils and reticular arrangement of cells resembling large mononuclear phagocytes. (Hematoxylin and eosin; ×500.)

destruction which had progressed posteriorly along the canal. The sheath surrounding the nerve and blood vessels, however, was not attacked. The destroyed bone was replaced by a jelly-like gray material lying in the meshes of a grayish granulation tissue. The wounds healed uneventfully in three weeks. However, roentgenograms taken a month and a half after the operation showed no regeneration of bone in either area nor any further progress in the lesion.

Examination.—Because of the peculiar nature of the lesions encountered, roentgenograms of all the bones of the body were taken. In addition to the area in the left parietal bone previously noted, there were similar punched-out areas of rarefaction in four ribs, the body and lumbar vertebrae on the right. There was also a pathologic fracture of the first rib on the right.

Microscopic examination of the curettings from the mandible showed a granulomatous lesion containing a striking number of normal adult eosinophils and eosinophilic myelocytes, which, in some areas, were so densely packed together that they were in the form of sheets. In addition, there was a reticulum of large pale cells with large

vesicular oval or infolded nuclei. (Fig. 4.) Areas of necrosis alternated with areas of apparently healthy granulation tissue. Some of the large cells were seen to have phagocytized fat particles and occasionally eosinophilic granules. No foreign body giant-cells were seen, although their presence had been noted in a few of the previously reported cases. The microscopic picture fitted exactly the histopathologic condition in eosinophilic granuloma of bone as described by Otani and Ehrlich[1] and Lichtenstein and Jaffe.[2]

Operation.—One month after biopsy of the mandibular lesions, the involved portion of the third rib on the right was resected. This showed lesions both grossly and microscopically identical with those in the mandible.

COMMENT

The etiology of this disease is obscure. Otani and Ehrlich[1] believe that it is due to trauma. Lichtenstein and Jaffe[2] implicate an infectious agent, possibly a virus, while Farber[3] has advanced strong evidence that it is a metabolic disease closely similar to a syndrome.

The disease occurs in young persons of either sex. Although the original descriptions of this disease dealt with cases showing solitary lesions, Farber[4] has described cases with multiple lesions in children, including two which exhibited mandibular involvement.

The lesion occurring in the mandible could be confused with simple granuloma, low grade osteomyelitis or, especially, any of the tumors of bone and bone marrow. The diagnosis may be suspected when areas of rarefaction in either maxillae or mandible which have no obvious etiology are revealed by the x-rays. Discovery of a grayish gelatinous type of granuloma on operation should also arouse strong suspicion of the true nature of the lesion. The diagnosis can be made only with certainty, however, by microscopic examination of a biopsy specimen. It is important to make a correct diagnosis, as the prognosis is good. According to Farber,[3] the lesions respond well to x-ray therapy, although new lesions may appear.

SUMMARY

An unusual type of benign eosinophilic granuloma of bone with lesions in the mandible may be confused with simple granuloma, low grade osteomyelitis or, especially, malignant tumors of bone. It is important to recognize this disease because, with x-ray radiation, the progress of the lesion may be halted and the patient permanently cured.

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THE MESIOCLUSODISTAL MATRIX

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IN the use of amalgam as a filling material, the presence of four lateral walls of a cavity is essential to prevent the mass from being forced out during the packing process while an attempt is made to condense the filling. This cavity, often complicated, presents obstacles in matrix adaptation. "A building is only as strong as its foundation." The matrix is the foundation of the mesioclusodistal amalgam restoration.

Mechanical matrix retainers, as well as seamless copper bands, as used in my practice, have not proved very effective. A firm, snug fitting and immovable matrix is necessary. The movement of the matrix during condensation causes a landslide of the previously condensed amalgam, resulting in a porous mass susceptible to future corrosion and ultimate failure of the filling.

The mechanical matrices are insecure and frequently are moved by the patient's lips or tongue. The appliances are often "in the way" of the operator and are very annoying to the patients, especially the young. The seamless copper band is thick and is difficult to move from the field while the amalgam is undergoing the setting stage. The copper band requires considerable time to form and adapt itself to the tooth. Frequently, it has been necessary to permit the copper band to remain on the tooth overnight, since removal during the early stages of crystal growth of the amalgam causes a flattening of the contact points. The objections to the copper bands and the mechanical matrices have led to experiments in matrix adaptation.

J. T. Sweeney[1] wrote:

I cannot overemphasize the necessity of a rigid and immovable matrix adaptation in condensing amalgam by machine. The steady pressures exerted during the operation will force a poorly adapted matrix to move, causing a landslide of the previously condensed amalgam. The matrix band must be tightly wedged at the gingival margin and must be well reinforced with modeling compound. . . . A casting is as nearly perfect as the mold."

The trades make accurate molds for their castings, so why should the dentist not make an accurate mold in which to cast an important amalgam filling?

Imagine a molder working for the casting division of a huge motor plant pouring metal for engine blocks into molds that are haphazardly set up to look like cylinders, then attempting to scrape, grind and hack the castings into the specified shapes and sizes.

Ramsay[2] writes:

One of my colleagues states that he spends more time in fitting and adjusting the matrix than he does in filling the cavity. A good matrix goes farther toward making a successful filling, granted all other things are equal, than almost anything else in the entire procedure and saves a tremendous amount of time, trouble and inconvenience to both patient and operator.

Fee[3] quotes C. N. Johnson as saying:

The two terms, contact point and interproximal space, should be an open book to any practitioner of dentistry. . . . Nature has done her best in the way of making an anatomic arrangement to avoid trouble. . . . It remains for the dentist to assist Nature by copying as best he may the arrangement thus provided, when he attempts to make fillings on the proximal surfaces.

Easton[4] writes:

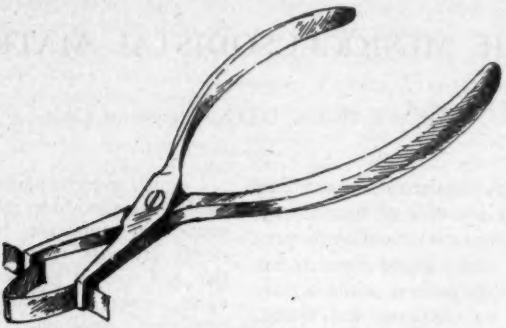

Fig. 1.—Steel matrix material in matrix forming pliers.

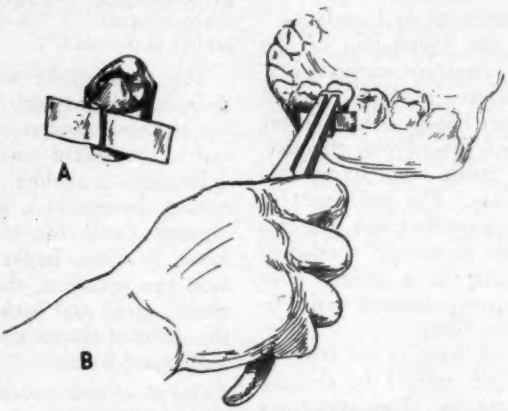

Fig. 2.—Band formed and ready for soldering.

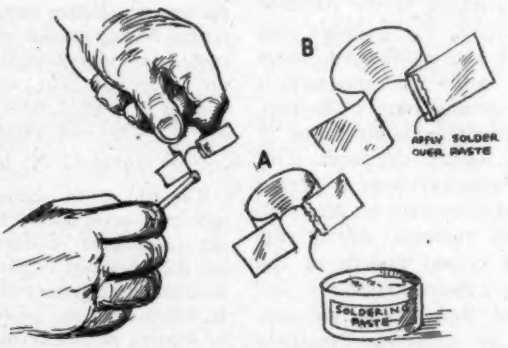

Fig. 3.—Applying the solder.

One important function of an operative restoration is to restore anatomic form and function. This can be achieved only when a proximal contour and contact normal *for that individual tooth* have been restored. . . . To apply a matrix is not enough: it

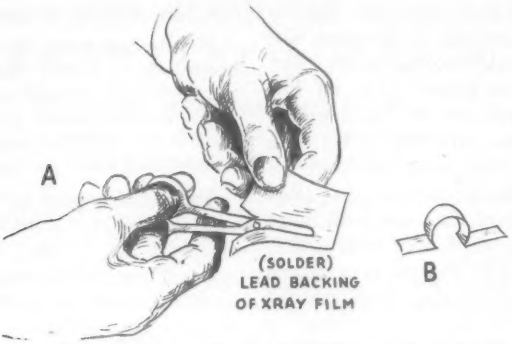

Fig. 4.—Lead backing of x-ray film used as solder.

Fig. 5.—Soldering the band.

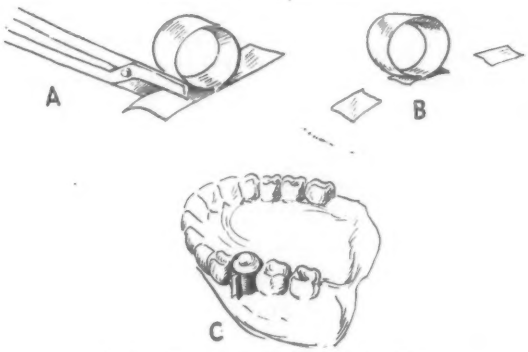

Fig. 6.—The completed matrix in place.

must be actually fitted to the individual tooth.

From the foregoing, we can readily understand the problem that these cavities have presented. The following technic is submitted as an aid toward eliminating many of these difficulties.

The procedure, in making an improved mesioclusodistal matrix band for permanent and deciduous teeth, is as follows:

A strip of carbon steel matrix material

about 1½ inches long and 0.002 thick is carried to the mouth by grasping the material in matrix-forming pliers, flat-nosed pliers or the fingers. (Fig. 1.) The tooth is encircled and the band tightly drawn to form a seam. (Fig. 2, B.) The band, which is now removed from the mouth, should be the correct size. (Fig. 2, A.) The ends of the band, which are turned outward, are coated with soldering flux. (Fig. 3.) The solder is placed between the ends of the band, grasped firmly in the beaks of a pair of soldering tweezers and held over the open flame. (Fig. 5.) When the solder has softened and the joint is tight, the solder is dipped into water to cool. Any solder can be used in conjunction with the soldering paste. It can be obtained in most hardware or 5 and 10 cent stores.

The average dentist has an excellent source of solder right in his own office, the tin lead backing of x-ray films. (Fig. 4.) This makes an ideal solder for this technic, because it is thin and flat and can be placed between the ends of the band with ease. Stainless steel matrix material can be used provided stainless steel flux is employed. This stainless steel flux can be obtained from the neighborhood plumber. We now have an individual, snug-fitting band for the tooth. This band is placed on the tooth, and contoured and wedged tightly on the gingival margin. (Fig. 6.) Sweeney suggests a triangular shaped wedge made from an ordinary tongue blade. He says:

> The wedge serves as a solid wall to strengthen the matrix band. . . . The few extra minutes required to form the wedge to the contour desired is saved many times over, as the proximal surface of the filling is completed when the band is removed.

The matrix may be removed at the same sitting by thinning some of the amalgam that is left over by picking up some of the excess mercury and placing it on the solder joint. The mercury will dissolve the solder and the joint will open.

The ease with which this matrix can be made and the convenience that it offers will eliminate many remakes and save considerable time, because the operator has cast the alloy into a predetermined mold that has restored contact and contours to the cavity. Therefore little or no time-consuming carving and polishing on the proximal surfaces need be done. The band can be removed at once, another time saver.

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JANUARY 1 *Editorial Department* 1944

POSTWAR PLANNING

POSTWAR planning in every walk of life, political, social, commercial, industrial, as well as medical and dental, seems to be the subject uppermost in the minds of the thinkers and writers of the day; and the dental literature is presenting its share of postwar planning, looking to the future. To be sure, all such forward-looking speculativeness is premised upon the winning of the war by the Allies, but a look around at the immediate present state of the war conveys the impression that such forethoughtedness may be somewhat premature, to say the least.

Such a physiologic reaction to the fortunes of war, however, is purely American and is warranted by the records of the past. However uncertain the future and however uncertain the influence of events of the present upon the future, it seems that planning for the future is but the normal precautionary measure in any serious crisis of the character of the present one.

The one fact that has been borne in upon dentistry as a public health measure, particularly during the first years of the war, is the distressing inadequacy of physical equipment to supply the need of dental service in any broad-gaged program intended to care fully for the needs of the public and the Army.

Long before the emergencies of the present war, the dental profession was fully cognizant of the inadequacy of its physical equipment to fulfil its part in any program of health service national and comprehensive in scope. The failure of the profession to correct this condition has been due to two intensely human characteristics, which need to be corrected before we can see the light of day, as it were. These two characteristics are procrastination and the reaction of the normal human mind to fear of pain. These two bugbear hindrances to care of the teeth become so distressing at times that we are apt to be confused as to the relative importance of the two greatest problems with which the dental profession has to deal—the prevention of dental caries and the prevention of dental pain.

We are sometimes impelled to the thought and belief that dentistry can never serve its full mission to humanity until some means is found that will permit its administration without any suggestion of pain—physical or mental.

The reluctance of the public to avail itself of dental service is dramatically illustrated in the condition in which the mouths of the first million draft inductees in the present emergency were found, and the reaction of the Government to the impediment which faulty mouths imposed upon the acquirement of Army personnel was the practical abandonment of any dental requirements for Army service. It seems now that the only dental equipment required is one that will enable the owner to bite and chew bananas and other equally soft foods. As a matter of fact, the inductee into the Army need have no natural teeth whatever, not even artificial ones; his needs in this direction being supplied in the rehabilitation program after entering service.

We are fearful at times that the psychologic reaction of the public to this disregard of dental equipment in the Army will discount all the efforts we have made for years to build for dentistry and to impress upon the public the desirability and necessity of proper care of the mouth and teeth as an important aid to bodily health. The attitude of the Army toward the teeth as exemplified in the removal of all masticating requirements is very apt to create in the mind of the Army man a fatalistic attitude of reconciliation to the loss of the teeth, as the implication is that they may be supplied by artificial ones to meet all masticating requirements.

Thus it will be seen that, rather than having his present heavy load lightened, the dentist will be called upon to do extra and additional

work. And that leads us back to a consideration of the educational system now in force to supply dental manpower to the Army. It now appears that the new system, professional education under direction of the Army and Navy, will hardly furnish the dental manpower needed in the Army, to say nothing of the increasing need among the civilian population, not a little of this increase being due to the demands of the Procurement and Assignment Committee in supplying the Army with dentists. The civilian need is becoming acute indeed and is apt to increase with time.

For some years, from 1924 to 1934, the number of dentists coming into the profession gradually decreased to a new low, and it is only in the past few years that we have been holding our own in numbers. In fact, it was only in 1942 that the enrollment of students gave any promise of sufficient increase to meet the increasing need—and now the Army has "taken us over," so to speak, and the public will have to bear the brunt of an evident greater shortage of dental manpower.

When the Government took charge of medical and dental education, we entertained high hopes that the increasing shortage in the profession would be counteracted and the needed increase supplied. It now appears that we are caught between two fires, the Government taking all and more than we could afford for the Army and, on the other hand, seriously considering legislation that will place impossible physical demands upon the dental profession.

Under a voluntary system, we are now seriously handicapped for manpower in dentistry, but under a proposed social security legislation that pretends to supply dental health service to the nation, the situation would be indeed tragic. This and the inordinate cost of such service probably accounts for the disregard of the dental aspects of general health service as evidenced in the Wagner bill now under consideration in the Senate.

It seems that we are in the anomalous position of restriction of output of dental graduates and a demand for service far beyond the physical capabilities of the profession, and, too, at a time when dentistry is just passing through the critical period of threatened shortage under normal conditions.

In the present issue, we are publishing an article by Dr. John Oppie McCall, director of the Guggenheim Dental Clinic in New York, in which he outlines an educational system for dental operators that he believes will meet the demand for dental manpower requisite for supply-

ing adequate dental health services for the nation at large. Dr. McCall is well qualified by experience in dental service to speak upon this subject, an experience gained in the practical application of the nearest approach that we have to the prevention of dental disease—clinical dentistry for the child.

While we do not agree entirely with all the phases of Dr. McCall's suggested program, we are sure that the results of his work in public dental health service have convinced him that his approach to prevention is the logical one in the light of the physical impossibility of meeting the situation on a nation-wide basis. Our objection to the program is mainly that it savors too much of the Owre plan of some years back. Both Dr. Owre and Dr. McCall appear to us to lay too much stress on the technician for supplying the larger portion of reparative dental work. We do not favor allowing such scope of dental practice to one not educated for and licensed to practice dentistry in the whole. To our way of thinking, allowing such scope to the technician would result in surrendering the practice of dentistry to a class that would practice it from the purely mechanical approach—the very conception of dentistry that we have striven to correct throughout our entire professional career.

Then, too, the creation of such a class would be doubly dangerous, if not foolhardy, at a time when the Government is agitating the adoption of measures designed to supply dental health service to all people. We are much inclined to the opinion that such an eventuality would expose us to the unfortunate dilemma in which England found herself in the first world war, when, to meet an overnight emergency, she licensed thousands of laboratory technicians to practice dentistry in full. We have had trouble and difficulty enough in instilling the biologic concept of dental practice without going through that process again and on a larger and even more difficult scale.

The feature of Dr. McCall's suggested plan that appeals to us most is that which is directed toward the rendering of dental service to children in their early life, say from 5 to 15 or a few years older, before we even consider a nation-wide reparative and restorative program.

We are convinced, and have been since the breakdown of our hopes for the effectiveness of oral hygiene, that dental service, to be efficient and cumulative in its benefits, must begin with the young child, in the hope that good mouth health habits will be so fixed that, when he grows up, he will not become dentally negligent.

Thus, the problem of dental health imposes two serious and difficult

obligations upon dentistry: to begin the service at the earliest possible age and to educate the patient in his personal obligation to continue, in later years, to practice the preventive measures taught him by precept, if not by example.

INDEX FOR 1943

THE Index for Volume 30, 1943, will be published this year separately from THE JOURNAL and will be supplied without cost to all members of the Association upon request.

The Index is being published in this manner in an effort to aid the Government in the conservation of paper.

A request slip for the Index appears on page A-51 of the Advertising section, and we urge all who wish copies of the Index to send in the request slip promptly. Requests without the slip, however, will also be honored.

BIBLIOGRAPHICAL

A Textbook of Exodontia

By LEO WINTER, D.D.S., M.D., F.A.C.D., F.A.C.S., Sc.D. (Hon.), LL.D., Professor of Oral Surgery, New York University; Director of the Oral and Minor Surgery Clinic, New York University College of Dentistry; Visiting Oral Surgeon in Charge, Bellevue Hospital; Consulting Oral Surgeon, Montefiore Hospital; Chief of Dental Clinic, New York University College of Medicine; Fellow, New York Academy of Medicine. Fifth revised edition, with 485 illustrations and 7 color plates; 576 pages. Price $10. St. Louis: C. V. Mosby Company, 1943.

THE fifth edition of Dr. Winter's popular "Textbook of Exodontia," the third edition to be released in the last six years, has many new features. The book has been revised in several sections, and new chapters have been added on chemotherapy and on general anesthesia for ambulatory dental patients.

The author begins with a consideration of such modern local anesthetic agents as procaine, apothesine, butyn, tutocaine and monocaine, discussing their relative merits. A thorough analysis is given of the technics of injections, both intra-oral and extra-oral. To illustrate these technics, excellent new full-page color drawings are included. The drawings show all the anatomic structures through which the operator must insert a needle to reach the mandibular and maxillary nerve trunks. These pictures and most of the other illustrations are of high caliber and clarify the text descriptions. Thirty pages are devoted to a discussion of accidents and infections associated with administering local anesthetics.

The chapter on general anesthesia, by Emory A. Rovenstine, M.D., is supplemented in this edition by a chapter on general anesthesia for ambulatory dental patients, by Anthony S. Mecca, D.D.S. Eighty-five pages are devoted to this subject.

Classification, diagnosis and treatment of oral cysts are included in this book, but tumors are not mentioned. Most of the space in the book is devoted to the technic

of extraction of teeth as taught by Dr. Winter. This book should prove interesting to every dentist who extracts teeth.

M. K. H.

Planning and Treatment for Bite Raising

By HARRY KAZIS, D.M.D., Boston, Mass. 538 pages, and 702 illustrations. Brooklyn: Dental Items of Interest Publishing Company, Inc., 1943.

IT has been mentioned often that bite opening is an extremely difficult branch of dentistry and one which should be attempted only by specialists. Dr. Kazis, however, after twelve years of experience in this field, feels that bite revision can be successfully attempted by any competent general practitioner, if he will study carefully each case, and then follow out the restorative procedures with meticulous attention to detail.

To help the general practitioner analyze his cases, Dr. Kazis has prepared this book. He presents first a review of the anatomy of the temporomandibular articulation, and then analyzes the mechanics of mastication. He tells how to plan the bite revision, discussing almost thirty cases in detail. He concludes with a consideration of operative technic and restorations. The drawings and photographs of models are excellent, but some of the clinical photographs are not very helpful.

Dr. Kazis is to be congratulated for his serious study of this difficult phase of dentistry. However, one wonders why he did not take advantage of more of the work done by other men in this field. A short and incomplete bibliography is included. Dentists who wish to practice bite revision will find the book helpful.

M. K. H.

Clinical Diagnosis by Laboratory Examination

By JOHN A. KOLMER, M.S., M.D., Dr. P.H., Sc.D., LL.D., L.H.D., F.A.C.D., Professor of Medicine in the School of Medicine and the School of Dentistry of Temple University; Director of the Research Institute of Cutaneous Medicine; formerly Professor of Pathology and Bacteriology in the Graduate School of Medicine of the University of Pennsylvania. 1239 pages with 75 illustrations. New York: D. Appleton Century Company, Incorporated. Price $8 postpaid.

IN the past two or three decades, there have been rapid developments of clinical pathologic, toxicologic, biochemical, bacteriologic, mycologic, parasitologic, serologic and immunologic methods of great practical value in the diagnosis and treatment of disease. Today, clinical diagnosis by laboratory examination has become a large and important subject in medicine, surgery and the various specialties.

This new book is devoted primarily to clinical interpretations and applications of laboratory tests on blood, urine, saliva, stomach contents, feces, transudates, exudates and the cerebrospinal fluid. In the belief that medical students and practitioners are more interested in the clinical applications of these tests, rather than in their technic, discussion of laboratory procedures is not emphasized. As a result, the book is not a laboratory manual, but a text on clinical diagnosis by laboratory examinations.

The illustrations are worthy of special mention. Several beautiful colored illustrations of reactions to skin tests are included, as well as many photos and drawings demonstrating phases of technic. A comprehensive bibliography is placed at the end of each chapter. More than 135 tables summarizing text material are scattered throughout the book.

Five pages are devoted to the technic of salivary examination, and eight pages to the interpretation of these examinations. The material presented in this section is accurate, but not exhaustive, and, from a dental point of view, superficial. One would hesitate to recommend it, therefore, to the average practicing dentist.

For medical students, physicians and teachers of medical subjects to medical and dental students, this book will prove very helpful.

M. K. H.

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WAR SERVICE COMMITTEE

DIRECTIVE ON PROCUREMENT

To Members of the War Service Committee: Drs. Gerald D. Timmons, Philip E. Adams, Joseph M. Glaser, H. O. Lineberger, P. C. Lowery, Oren A. Oliver, B. K. Westfall.

The Surgeon General of the Army has announced, under date of December 9, 1943, that procurement for the Army, of dentists from civilian practice, has ceased. However, all cases actually in process for commissioning will be completed, but state chairmen for Procurement and Assignment Service have been notified not to refer any more dentists from civil life to the Army Procurement Office until further notice. Army Specialized Training Program graduates will continue to be commissioned.

This directive, of course, does not mean that recruitment has stopped, because the Navy needs more dental officers from civilian life. Chairmen for Procurement and Assignment have been advised to continue providing available dentists and to refer all names to the Navy Procurement Office and to the Central Board of Procurement and Assignment Service, so that invitations and availability clearance can be prepared in the usual manner.

Obviously, this action of the War Department places the responsibility upon Selective Service to defer dentists whose numbers are called and who are unable to obtain commissions, but inasmuch as there is now an even greater over-all shortage of dentists in civilian practice, every effort should be made to prevent their induction as privates. The Committee has been assured that Selective Service has not changed its policy on the "essentiality" of dentists.

Sincerely,

C. WILLARD CAMALIER, *Chairman,*
1726 Eye St., N. W.
Washington, D. C.

SHORTAGE AND EQUITABLE DISTRIBUTION OF DENTAL INSTRUMENTS

To the Members of the Dental Profession:

The War Service Committee desires to express its appreciation to the secretaries of state dental societies, state military affairs committees and others for their prompt response to the Committee's request for current information on the shortage of important instruments used in dental practice, such as handpieces and burs, in order that the information might be assembled and presented to the War Production Board. More than forty states responded, giving the Committee and the WPB a fine cross-section of the sentiment of the country on this vital matter of dental instruments. It will be used by the government agency mentioned in its deliberations with the officials of the armed forces, to the end that, it is hoped, an equitable distribution may be made between the armed forces and civilian practice. The result of the survey indicates clearly that there is a serious shortage in dental burs and dental handpieces and that additional efforts must be made by the manufacturers, with the aid of the War Production Board if necessary, to increase the production of

both dental burs and dental handpieces.

Resharpening of dental burs, the increased use of stones, diamond points and cutting instruments and the repair of handpieces are being resorted to by thousands of dentists in civilian practice and in the armed forces, and the Committee emphasizes that this should be continued and extended by all members of the dental profession, including those in the armed forces, if we are to be carried through the emergency with minimum requirements.

Frequent conferences are being held with governmental agencies and with dental manufacturers, at which the President of the American Dental Association, C. Raymond Wells, is in attendance, in an effort to alleviate these conditions as far as is practicable. Some of these call for the protection of the manpower of the manufacturers and increased facilities, and include emphasis upon the use of diamond points and the resharpening of burs, all of which should have the prompt and complete cooperation of every dentist in civilian practice and the armed forces.

WAR SERVICE COMMITTEE,
C. WILLARD CAMALIER, *Chairman.*
December 7, 1943.

DENTAL CARE IN THE ARMED FORCES

THE committee announces a recent release from the Office of War Information under the title "Health of the Armed Forces" and quotes under "Dental Care" the following, which is informative to the profession:

"The Army has a Dental Corps of 13,000 officers and wishes to commission another 800 civilian dentists, and will commission another thousand from dental schools. Those in the service now have a record of four million cases admitted to treatment during 1942, and more than 12½ million sittings. They installed more than seven and a half million fillings and, during the month of March, 1943, extracted 582,546 teeth. In the same month, they replaced 456,783 teeth, and it was stated that more than half the patients treated had not been accustomed to visit dentists regularly.

"Dentists have been provided with portable equipment, collapsible chairs, and foot-powered drills and portable sterilizers, for use close to combat areas. Records show that there are, under these conditions, about 250 sittings per thousand men.

"The Navy has 4,000 dental officers, at least one assigned to every ship of cruiser class, or larger, and to every tender, hospital ship and transport. In a recent month, the corps installed 50,000 fillings and restorations. Naval dentists have the same training routine as the doctors since they may have to double for medical officers in the exigencies of combat. Their training school is at Bethesda, Maryland, and they may volunteer for special services such as paratroops, marine or submarine work. Those who specialize in maxillo-facial surgery are sent to the Mayo Clinic for study. This work of restoring facial structure damaged in battle may include plastic surgery also, and has an important place in service plans for rehabilitation of service men after and during, the war.

"What these facts and statistics mean in essence is that every effort is being made to insure the dental health of the men of the armed services, and to save them pain incident to such infections and that this work is performed in dental combat areas."

C. WILLARD CAMALIER,
Chairman.

BUREAU OF PUBLIC RELATIONS

CARLETON COLLEGE DENTAL HEALTH SERVICE, NORTHFIELD, MINN.

WILLIAM A. GREY, D.D.S., St. Paul, Minn.

THE Carleton College Dental Health Service has now been in operation since January 1, 1931. The service is purely x-ray examination and diagnosis. Each case is examined thoroughly, first without the x-rays and then by use of the x-rays, so as to bring out the importance of the full mouth x-ray examination. A tentative diagnosis is made and complete records are kept. No instruments are used in the examinations except the mirror and explorer. No restorative work whatever is done. Also no work is referred, as our preference is to have our students take the roentgenograms, with tentative diagnosis, to the dentist of their choice.

A full account of the work of the Carleton College Dental Health Service was given in the June 1942 issue of the JOURNAL. Any one wishing to know more about our work as a whole may refer to that article (page 1045).

What we wish to emphasize to the dental profession at this time is the importance of thorough examination of young people's mouths during their college years. We know that an examination can be efficient only when full mouth x-ray films are included.

We keep complete monthly records and, at the end of the year, these monthly records are summed up and included in an annual report, which is presented herewith.

DENTAL HEALTH SERVICE ANNUAL REPORT, 1942-1943*

Number of students examined	834
Number of missing teeth	2,758
Number of teeth extracted	969
Number of cavities found without aid of x-rays	784
Additional cavities found with assistance of x-rays	1,561
Total number of cavities found	2,345
Questionable cavities found with x-rays	390
Average number of cavities per student	2.84
Number of devitalized teeth	99
Number of apical areas	29
Number of definite impactions	202
Number of extractions recommended	387
Number of unerupted teeth (principally third molars)	2,049
Number of amalgam fillings	8,656
Number of gold fillings	1,705
Number of silicate fillings	1,051
Number of cement fillings	69
Number of gutta-percha fillings	15
Number of Davis crowns	4
Number of three-quarter crowns	11
Number of oxyphosphate of copper fillings	21
Number of porcelain jacket crowns	21
Total number of fillings	11,524
Average number of fillings per student	13.93
Number of faculty members examined	19
Number of assistants examined	3
Number of foodhandlers examined	85
Total number of patients examined during the year of 1942-1943	940

*This clinic is purely diagnostic, no operations being performed.

NEW DENTAL HEALTH FILM PRODUCED BY CHICAGO GROUP

JOSEPHINE BESSEMS*

SEEING is one of the most potent means of telling a convincing story. Business has long recognized the enormous potentiality of motion pictures and slide films as sales agents and has demonstrated that their effectiveness is greatly enhanced by the addition of sound. Tests by educators have proved that sound pictures hold the attention better than "in person" demonstrations and lectures, and that facts conveyed by sound films stick in the human mind

Alan Morton is called upon to explain why his department is holding up production.

longer and more comprehensively than when conveyed by other media.

The Dental Hygiene Institute of Chicago, public relations affiliate of the Chicago Dental Society, has found that sound films are an effective medium for telling dentistry's story to the lay public, and the production and showing of educational films form an important part of the program of public education being undertaken by the Institute.

The Institute has recently completed production of its second film, a sound slide film titled "The Mortons Make Some Changes." This film, designed for adult audiences, tells an entertaining story, in dramatized form, of a typical American family and how their troubles were solved by dental care. It is a convincing presentation of what regular and

Dr. Thompson tells Dick and Bob what foods they should eat to build strong, healthy teeth.

Dr. Thompson explains to Mrs. Morton the importance of regular checkups.

adequate care of the teeth can do for the individual in terms of health and happiness.

As the scene opens, Alan Morton, who is a department superintendent for a manufacturing company, is called on the carpet to explain why his department has been falling behind in production. His excuse is that he is tired

*Educational director, Dental Hygiene Institute of Chicago.

all the time, his head aches, he feels "rotten." He is told to take a month off to get himself in shape, with the intimation that if he can't keep the production line rolling, some one else can.

At home, Grandma is having trouble with her 10-year-old dentures, which persist in coming loose at the most inopportune moments. Alan's wife insists that Grandma visit the family dentist to see if something can't be done about the unruly dentures. She urges Alan to go along—perhaps his teeth are the cause of his troubles.

Dr. Thompson finds that Alan, who has neglected his teeth because he thought that he was too busy to take time for checkups, has two abscessed molars and incipient pyorrhea. The dentist explains, with the aid of x-ray films and diagrams, how these conditions develop and how infected teeth affect the general health. He explains also why lost teeth shoulu be replaced.

Impressed, Alan loses no time in checking up on the family, insisting that his wife take their two boys, aged 5 and 9, to see Dr. Thompson. This gives the dentist an opportunity to discuss the care of deciduous teeth and to stress nutrition during the tooth-forming years.

The final scenes, after a time lapse of several months, show Alan back on the job, beating production records. He brings the boss home to dinner, where he meets a rejuvenated Grandma, and there is a suggestion of a budding romance.

Only professional talent was used in the production, including actors and script writers. Dental detail was supervised by dentists. The importance of regular examinations by a dentist, to detect trouble before it has a chance to develop, and the unhappy consequences of neglect are emphasized all through the story.

"The Mortons Make Some Changes" is a sound slide film, which consists of a series of "still" pictures on a continuous roll of 35 mm. film comparable to moving picture film. Each section or "frame" is shown as a regular lantern slide, successive pictures being projected on the screen and held there to the accompaniment of dialog or the narrator's description, the sound coming from a recording, the record player being built into the projector. (A sound slide projector with turntable is necessary, as the film cannot be shown with an ordinary motion picture projector.) The running time is twenty-seven minutes.

The Dental Hygiene Institute is showing "The Mortons Make Some Changes," without charge, before lay groups (women's clubs, parent-teacher associations, church organizations, men's service clubs, industrial groups, etc.) in Chicago and suburbs. The Institute's field representative, a woman experienced in club contact work, takes the projection equipment with her to these meetings, shows the film and conducts a round-table discussion afterwards. Because the type of questions asked by the audiences is such that only a dentist should attempt to answer them, arrangements are made to have a dentist present for the discussion period. Members of the Chicago Dental Society, busy as they are at the present time, have been most cooperative in accepting these assignments.

While the Dental Hygiene Institute shows the film only in Cook, Lake and DuPage Counties, Illinois, copies can be purchased by dental societies, public health agencies and educational organizations in other sections of the country at a cost of $25 for the print and recording. The film will be shown at the Midwinter Meeting of the Chicago Dental Society at the Palmer House, Chicago, February 21-23. For information, address the Dental Hygiene Institute of Chicago, 30 North Michigan Ave., Chicago, Ill.

NATIONAL SOCIAL HYGIENE DAY, FEBRUARY 2, 1944

UNITED community action against venereal disease, the country's number one health problem, is the theme of National Social Hygiene Day, February 2.

As in past years, Social Hygiene Day, sponsored nationally by the American Social Hygiene Association, will be the occasion, in thousands of communities throughout the country, for intensifying the year-round campaign against venereal diseases and all conditions favoring their spread.

In announcing plans for this year's Social Hygiene Day, Walter Clarke, executive director of the American Social Hygiene Association, stressed the fact that syphilis and gonorrhea still are the most important health problems of the Army, Navy, war workers and youth in general.

"The key to future progress against the venereal diseases is common action," Dr. Clarke said. "More than any other health problem, these infections must be the concern of every one in the community. It is our hope that this year's Social Hygiene Day will be a focal point for giving increased support to measures intended to help win the war, safeguard health and character, and protect the American family as the basic institution of our country."

Interested individuals and groups can obtain leaflets giving full details on this event by writing to the American Social Hygiene Association, 1790 Broadway, New York 19, N. Y.

TALES FROM IVORY TOWERS*

TALES from Ivory Towers is a series of thirteen fifteen-minute radio programs in electrical transcription form.

Each broadcast consists of an episode, dramatically presented, from a great book that all children love. Inserted in each broadcast are two terse dental health messages tuned to the spirit of the story.

Educators believe that the two greatest things which can be given children during their elementary school years are the ability to read well and a love of good books. Dentists know how important it is that children learn the value of mouth health during their elementary school years. Therefore, in preparing this radio material, the Bureau has endeavored to interest children in good literature as well as in mouth health.

Tales from Ivory Towers offers dental societies and boards of education an opportunity to present a joint radio program that is unique, interesting and educational.

The broadcasts are written, directed and produced by professionals. Mrs. Ruth Harshaw, who planned and wrote the scripts, is an educator with wide experience in the radio field. She is the author of two children's books, one of which, "Reindeer of the Waves," was a Literary Guild choice. Besides writing and producing "The Book Shelf," a dramatic radio review of new books for WLS, she is author of "The Battle of Books," a quiz radio program sponsored by the Chicago Board of Education.

The storyteller, Helen Buell, a graduate of the University of Wisconsin, School of Drama, studied in Paris and was resident director of the Berkely

*Thirteen radio programs by the Bureau of Public Relations, American Dental Association, 222 E. Superior St., Chicago, 11, Ill.

Theater. Several years in stock, on Broadway and in New York Theatre Guild productions prepared her for radio, where she has been heard on Ma Perkins, Bachelors' Children, The Romance of Helen Trent, Easy Money and other favorites.

Albert R. Crews, the director, was for many years the head of the radio department of Northwestern University. Besides being NBC editor, he is director and producer for the Central Division of NBC.

Lee Bennett, the announcer, one of the best on WGN, has been featured in Harmony Hall, Chicago at Night, Stars of Tomorrow and the WGN Band Wagon.

Although Tales from Ivory Towers is aimed at the 7 to 11 age group, the stories are so well selected and well presented that they attract and hold the attention of all age groups.

HOW TO OBTAIN TALES FROM IVORY TOWERS

If your society is interested in presenting a high-grade professional radio program, we will, upon request, lend you two transcriptions for audition purposes. While this series of broadcasts may be sponsored by your dental society alone, the program would be infinitely more effective if sponsored jointly by the dental society and the board of education or by the board of education alone. Therefore, it is urged that your educational officials be invited to participate.

This is a program particularly suitable for dental societies and boards of education. The health of the body and health of the mind are closely related. There are so many influences in children's lives the effects of which are negative that any project with a positive influence for good is welcomed by educators and parents. The hair-raising radio and movie programs aggressively seek the child's interest. It is high time that some aggressive action be taken to widen the interest of children in good books.

Tales from Ivory Towers gives dentistry an opportunity to aid educators in their efforts to interest children in better literature and, at the same time, interest both parents and children in better dental health.

COST

Single records sell for $3 each. The entire series of thirteen records sells for $25.

LIST OF BROADCASTS

1. "The Little Lame Prince." Muloch Craik's fairy story of the crippled child who was gifted with a magic cloak. It is particularly fitting for a health program.

2. "Winnie the Pooh." The adventures of A. A. Milne's lovable teddy bear and Piglet and Eeyore are always appealing to children.

3. "Pecos Bill." James C. Bowman's exciting tale of the cowboy with superhuman powers.

4. "Peterkin Papers." Lucretia Hale's riotous story of a rather screwball family is a familiar favorite of most children.

5. "Joan of Arc." Today, when young people are facing heroic situations all over the world, Boutet de Monvel's inspiring story of a famous heroine is particularly fitting.

6. "Call It Courage." Armstrong Sperry's exciting story of a young South Sea Islander's battle with himself to overcome his fears.

7. "Bambi." Though this story by Felix Salten is familiar to most children, it always bears repetition.

8. "The Good Master." Kate Seredy's Hungarian tale of a feud between a farmer boy and his city-bred girl cousin.

9. "The Moffats." The charm of this book by Eleanor Estes lies in its delight-

ful presentation of the daily life of a family of children.

10. "Silver Chief." The account by Jack O'Brien of Silver Chief's adventures in the far north have a gripping fascination for those who love dogs and the wild early Alaskan history.

11. "Mr. Popper's Penguins." Richard Atwater's humorous tale of Mr. Popper, his family and his family of penguins will ever remain a favorite with children.

12. "Caddie Woodlawn." In this story by Carol Brink, Caddie, a young pioneer girl in Wisconsin, bravely faces a crisis during an Indian uprising.

13. "Adam of the Road." Elizabeth Janet Gray's story, with a medieval background, of a young boy whose traveling companions are set upon by robbers.

ORAL HYGIENE BUILDING, NORTH CAROLINA STATE BOARD OF HEALTH

NORTH CAROLINA can be justly proud of her leadership in the field of public health dentistry, being credited with three "firsts" in the field.

The North Carolina State Board of Health initiated the first dental health service in 1918. At that time, six dentists were employed to work in the schools through the Division of School Medical Inspection.

Fig. 1.—Oral Hygiene Building, North Carolina State Board of Health, Raleigh.

In 1936, North Carolina established an institute of public health dentistry in the Division of Public Health at the University of North Carolina, the first of its kind in America.

In November 1941, the North Carolina State Division of Oral Hygiene moved into its new oral hygiene building, the only building of its kind in the country. The building, which is 33 by 45 feet, is of fire-proof construction, faced with red brick, and with white cast-stone trim. There is no waste space in this modern two-story English basement building, as it was planned to fit the needs of the dental division.

Fig. 2.—Entrance, Oral Hygiene Building, North Carolina State Board of Health, Raleigh.

North Carolina's oral hygiene building is a lasting tribute to Carl V. Reynolds, M.D., state health officer and ardent friend of dentistry, and to Ernest A. Branch, tireless director of the state oral hygiene division.

A.D.A. 1944 APPOINTMENT BOOKS EXHAUSTED

WE are sorry to inform members that the stock of A.D.A. 1944 Appointment Books was completely exhausted by the middle of December. We realize that this is a disappointment to many members, but paper and bindery shortage prevents a reprinting of the book at this late date.

Next year, please order your 1945 Appointment Book early in the fall and thus help us prevent a recurrence of this unfortunate situation. It is suggested that regular users place a standing annual order for the Appointment Book to assure prompt and early delivery each year.

NEW DENTAL EXHIBIT FOR SMITHSONIAN INSTITUTION

LAST September, the American Dental Association presented the Smithsonian Institution, Washington, D. C., with a new dental health exhibit prepared by the Bureau of Public Relations, to replace an exhibit furnished the Institution by the Association in 1926.

The new exhibit consists of three panels set in V formation. The left panel contains five large colored translights illustrating the results of dental neglect. The right panel contains five translights illustrating methods of controlling dental caries. The center panel bears descriptive legends. The exhibit, which is 60 inches high, 44 inches wide and 12 inches deep, occupies a prominent position in the Public Health Section of the National Museum.

The following formal acknowledgement has been received from the Smithsonian Institution:

Gentlemen:

It is with pleasure that I now make formal acknowledgement of the receipt of a collection of materials illustrating dentistry and oral hygiene, which you have kindly supplied for the national collections.

The specimens have been entered on the Museum records as a gift from the American Dental Association, and I would assure you of our appreciation of your interest and cooperation in this connection.

Very truly yours,

J. E. GRAF,
Associate Director.

Dr. Charles Whitebread, associate curator, Division of Medicine and Public Health, Smithsonian Institution, cordially invites American Dental Association members to join the hundreds of thousands of annual guests who visit this and other Smithsonian Institution health, educational and historical exhibits.

DENTISTRY
HEALTHY, WELL SHAPED TEETH AND A CLEAN MOUTH ARE ESSENTIAL TO PHYSICAL WELL-BEING AND APPEARANCE
MEASURES THAT WILL HELP CONTROL DENTAL DISEASE ARE:
1. FREQUENT AND THOROUGH INSPECTION AND CARE OF THE TEETH AND MOUTH BY A DENTIST, BEGINNING WHEN THE CHILD IS 2½ OR 3 YEARS OF AGE AND CONTINUING THROUGHOUT LIFE
2. A WHOLESOME, WELL-BALANCED DIET THROUGHOUT LIFE, ESPECIALLY DURING THE EARLY FORMATIVE YEARS
3. THOROUGH CLEANSING OF THE MOUTH *DURING EACH MEAL* BY EATING FIBROUS, CLEANSING FOODS AND BY CORRECT TOOTHBRUSHING *AFTER EACH MEAL*
GIFT OF THE AMERICAN DENTAL ASSOCIATION

Exhibit from the Bureau of Public Relations, American Dental Association on display at the Smithsonian Institution, Washington, D. C.

COUNCIL ON DENTAL THERAPEUTICS

NOTICES OF JUDGMENT UNDER THE FEDERAL FOOD, DRUG AND COSMETIC ACT

781.* Misbranding of Eff-Remin Dentifrice. U. S. v. 34 Packages and 11 Packages of Eff-Remin Dentifrice. Default decree of condemnation and destruction. (F.D.C. No. 7455. Sample No. 98285-E.)

May 4, 1942, the United States attorney for the District of Massachusetts filed a libel against thirty-four packages, each containing 150 gm., and eleven packages, each containing 300 gm., of Eff-Remin Dentifrice at Boston, Mass., alleging that the article had been shipped in interstate commerce on or about April 22, 1942, by Goodrich & Love from New York, N. Y., and charging that it was misbranded.

Analysis of a sample of the article showed that it consisted essentially of tartaric acid and salt and compounds of calcium, magnesium and sodium, including carbonates and sulfates, flavored with volatile oils and sweetened with saccharin.

The article was alleged to be misbranded in that the statements in the labeling (tin container) "Rub powder directly on gum margins or place some powder on thin layer of moist cotton wool and apply to affected areas," and (circular) "'Eff-Remin' Dentifrice is an effervescent remineralizing powder. It is of value in reducing sensitivity, for controlling decalcification due to erosion or dental caries, for 'soft' teeth . . . apply to affected areas," were false and misleading since they represented and suggested that, when applied to affected areas, it would be of value in reducing sensitivity, in controlling decalcification due to erosion or dental caries and for "soft" teeth; whereas, when applied to affected areas, it was of no value for such purposes.

It was also alleged to be misbranded in violation of the provisions of the law applicable to cosmetics, as reported in Notices of Judgment on Cosmetics.

June 15, 1942, no claimant having appeared, judgment of condemnation was entered and the product was ordered destroyed.

4246.† Adulteration and misbranding of Hemo. U. S. v. 19 Cases of Borden's Hemo. Default decree of condemnation. Product ordered delivered to a charitable institution. (F.D.C. No. 8022. Sample No. 7303-F.)

August 1, 1942, the United States attorney for the District of Minnesota filed a libel against nineteen cases of the above-named product at Minneapolis, Minn., alleging that the article had been shipped in interstate commerce on or about April 10 and June 25, 1942, by the Borden Co. from Waukesha, Wis., and charging that it was adulterated and misbranded. The article was labeled in part: "Borden's Hemo Vitamin and Mineral Fortified Preparation for Malted Drinks (Chocolate Flavored)."

It was alleged to be adulterated in that the valuable constituents, calcium and phosphorus, had been in whole or in part abstracted or omitted therefrom.

It was alleged to be misbranded in that the statements on the label, "Composition by Assay of Chocolate Flavored Hemo per Ounce . . . Calcium 0.564 Gram, Phosphorus, 0.690 Gram. . . .

*Drugs and Devices.

†Foods.

Each serving (⅔ ounces or 2 heaping teaspoonfuls) contains approximately one-half of the daily minimum requirements of adults for . . . calcium, phosphorus," were false since it contained less than 0.564 gm. of calcium per ounce and less than 0.690 gm. of phosphorus per ounce, and each serving of two-thirds ounce or 2 heaping teaspoonfuls would contain less than one-half of the minimum daily requirements of adults for calcium and phosphorus.

It was alleged to be misbranded further in that certain statements in the labeling which represented that it is practically impossible to obtain sufficient vitamins and minerals except through the use of the article or a similar one; that convalescents, children, old people, dieting women and others could assure themselves of their quota of essential vitamins and minerals by its use; that greater vigor and vitality would be the result of its use, and that low resistance, frequent colds, impaired nerves, poor appetite, poor digestion, low energy, faulty bone structure, poor teeth, general weakness, low vitality, nutritional anemia, paleness and poor bones could be prevented or corrected by its use were false and misleading, since it is not practically impossible to obtain sufficient vitamins and minerals except through the use of such an article, and its use would not have the results claimed in such statements.

September 15, 1942, no claimant having appeared, judgment of condemnation was entered and it was ordered that the product be delivered to a charitable institution.

4248. Adulteration and misbranding of Vi-Penta Drops 'Roche.' U. S. v. 234 Vials of Vi-Penta Drops 'Roche.' Default decree of condemnation and destruction. (F.D.C. No. 4833. Sample No. 69145-E.)

This product was represented to contain 9,000 U.S.P. units of vitamin A per 0.6 cc., but in fact contained not more than 3,500 U.S.P. units of vitamin A per 0.6 cc.

May 27, 1941, the United States attorney for the Southern District of New York filed a libel (amended September 16, 1941) against the above-named product at New York, N. Y., alleging that the article had been shipped in interstate commerce on or about April 22, 1941, by Hoffman-LaRoche, Inc., from Nutley, N. J.; and charging that it was adulterated and misbranded.

The article was alleged to be adulterated in that a valuable constituent, vitamin A, had been in whole or in part omitted or abstracted therefrom.

It was alleged to be misbranded in that the following statements (circular) were false and misleading since the article would not be efficacious for such purposes: "Each 10-minim dose of Vi-Penta Drops contains: Vitamin A 9,000 U.S.P. Units. . . . Indications for Vi-Penta Drops. . . . For the normal growth and development of infants or children. In cases of malnutrition, lowered resistance or run-down states. During prolonged illness such as infections, anemias, tuberculosis, typhoid, etc. . . . For gastrointestinal conditions such as diarrhea, colitis, etc. When restrictions in diet are necessary, as in obesity, diabetes, catarrhal jaundice, etc. Whenever the total food intake must be increased, as in hyperthyroid conditions. For the treatment of certain skin diseases, such as eczema. In certain allergic conditions, such as those due to milk, eggs, wheat, etc. During periods of temporary or persistent vomiting (in infancy, childhood, or pregnancy). In the prophylaxis or treatment of abnormal dentition (or gum and tooth conditions)."

It was also alleged to be adulterated and misbranded under the provisions of the law applicable to drugs as reported in D.D.N.J. No. 774.

March 17, 1942, Hoffman-LaRoche,

Inc., claimant, having consented to the entry of the decree, judgment of condemnation was entered and the product was ordered destroyed.

ACCEPTED DENTAL REMEDIES

The Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following articles in the list of Accepted Dental Remedies:

GLYCERIN AND RELATED COMPOUNDS*

Propylene Glycol: Racemic 1, 2 dihydroxypropane.

ACTIONS AND USES: Propylene glycol is used as a diluent or binder, often as a substitute for glycerin or alcohol. Its toxicity is similar to that of glycerin. As ordinarily employed, it is practically non-toxic.

Propylene Glycol—Dow.

Manufactured by the Dow Chemical Co., Midland, Mich.

PROPERTIES: Propylene glycol occurs as a viscous, colorless, almost odorless liquid. It is miscible with water, acetone, alcohol and chloroform in all proportions. It is soluble in ether and will dissolve many essential oils, but is immiscible with fixed oils.

Specific gravity at 25/25°C.	1.035-1.037†
Refractive index at 25°C.	1.4300-1.4310
Distillation range in °C.	182-193
5 to 95 per cent	185-190
(A.S.T.M. method to D-268-42)	
Non-volatile residue not more than	0.01 per cent

Acidity.†—Add 1 cc. of phenolphalein test solution to 50 cc. of distilled water, then add tenth-normal sodium hydroxide until the solution remains pink for thirty seconds. Now add 10 cc. of propylene glycol, accurately measured, and titrate with tenth-normal sodium hydroxide until the original pinkness remains for thirty seconds. Not more than 0.2 cc. of tenth-normal sodium hydroxide is required.

Chloride.†—To 10 cc. of a solution of propylene glycol (1 in 10) and 1 cc. of diluted nitric acid, add 0.5 cc. of silver nitrate T.S. Any turbidity is not greater than that produced by 1.0 cc. of fiftieth-normal hydrochloric acid when treated with the same quantities of diluted nitric acid and silver nitrate in the same total volume.

Sulfate.†—Dilute 5 cc. of propylene glycol with 15 cc. of distilled water and add 5 drops of hydrochloric acid and 5 drops of barium chloride T.S. No turbidity is produced.

Heavy Metals.†—Mix 5 cc. of propylene glycol with 2 cc. of tenth-normal hydrochloric acid and dilute to 25 cc. with distilled water. The heavy metals limit of propylene glycol, determined on this solution, is 5 parts per million.

Arsenic.—Not more than 2 parts per million.

Assay.†—Weigh accurately, by means of a weighing pipet, about 0.3 gm. of propylene glycol, transfer to a 100 cc. volumetric flask and add sufficient distilled water to make 100 cc. Transfer exactly 10 cc. of the resultant solution to a 125 cc. Erlenmeyer flask, add 5 cc. of tenth-normal periodic acid, swirl and permit to stand for fifteen minutes. Add 10 cc. of a saturated solution of sodium bicarbonate followed by 15 cc. of tenth-normal sodium arsenite and 1 cc. of 5 per cent potassium iodide solution. Add sufficient sodium bicarbonate so that, at the end point, there will be several grams of solid sodium bicarbonate remaining undissolved, and titrate with tenth-normal iodine, using a 10 cc. microburet. Titrate until the appearance of a faint yellow. Run a blank, using the same quantities of reagents omitting the propylene glycol. Subtract the number of cubic centimeters of tenth-normal iodine required for the blank from the number of cubic centimeters required for the assay. Each cubic centimeter of tenth-normal iodine is equivalent to 0.003802 gm. of propylene glycol. The product should contain at least 97.5 per cent by weight of 1,2 dihydroxypropane.

Admission of a product to the list of Accepted Dental Remedies does not imply a recommendation. It means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs

*A.D.R. Ed. 9, p. 135.

†Bulletin National Formulary Committee, September-October 1942, pp. 184-190.

and dental cosmetics. All information is available upon request and inquiries are welcomed. A postal card will bring a prompt reply.

DONALD A. WALLACE, *Secretary*

COMMITTEE ON LEGISLATION

VALIDITY OF STATUTE REGULATING ADVERTISING BY DENTAL LABORATORIES

LESLIE CHILDS, Indianapolis, Ind.

THERE is no longer any doubt about the power of a state to regulate dental advertising by statute. The subject has been litigated in a long line of cases and, while there are minor exceptions based upon the wording of particular statutes, the courts are in accord on the main issue.

However, the closely related question of the validity of statutes regulating dental laboratory advertising, in its relation to the practice of dentistry, has not been so widely passed upon. But in Oshins *v.* York *et al.*, 150 Fla. 690, 8 So. (2d) 670, the point was raised and decided in an interesting manner under the Florida dental act.

FACTS IN THE CASE

Here, among other things, dental laboratories were exempted from the Florida dental act. However, their exemption carried the following restriction on their right to advertise their services. The act recited:

> . . . provided that such person or persons, association, corporation, or other entity, shall not solicit or advertise, directly or indirectly, by mail, card, newspaper, pamphlet, radio, or otherwise, to the general public to construct, reproduce, or repair prosthetic dentures, bridges, plates, or other appliances to be used or worn as substitutes for natural teeth or for the regulation of natural teeth.

The appellant was charged with violation of this statute in that, while he had a license to operate a dental laboratory, he was not a licensed dentist and he advertised the sale of dentures in the daily papers; and that, when customers responded, he directed them to a licensed dentist for a prescription, which the appellant filled in the course of his business.

In defense, the appellant questioned the constitutionality of the advertising restriction in the statute. He set up that he was a business man, not a dentist; that, under the law, he was licensed to operate a dental laboratory, and that the restriction on the right to advertise his services violated his constitutional right to trade; and that it was arbitrary and unreasonable and deprived him of his property without due process of law.

Upon the trial, the lower court upheld the statute and rendered a decree enjoining the appellant from advertising as has been outlined. The appellant appealed, and the higher court in stating the question in issue said:

> It is true his [appellant's] type of business has been exempted from the dental act, but the same act which affords the exemption enjoins advertising by those exempted. The question is, then, is the act in question arbitrary and without reason?

After the foregoing statement, the

court directed its attention to the whys and wherefores of the legislation in hand; and while, of course, the court dealt only with the case before it, the language employed constitutes one of the clearest expositions, of the basic *reason* for practically all dental regulatory legislation that is to be found in the books.

THE REASONING OF THE COURT

The legislature found as a fact the practice of dentistry affected the public health. This is a fact of common knowledge. The legislature also found that only those duly qualified should practice dentistry. The purpose of the law is the protection of the general public. Let us see how the public is best protected.

The appellant is admittedly not amenable to the act as a dentist. If the public be lured to the appellant's "business establishment" by convincing advertisements, the obvious purpose of appellant is to sell dentures without regard to medical need of same. If it be urged that they are never furnished except on prescription of a duly licensed dentist, the question arises whose patient is the customer?

If he comes to the business man (appellant) and is sent by the latter to a dentist, the temptation is great to prescribe dentures. The chances are enhanced that unless the prescription favors that appellant's business, few patients will be sent to the same dentist thereafter. We do not think this practice is conducive to the loyalty that should exist between patient and doctor. . . .

We think, therefore, the legislature had a sound reason to enact a law to see that this situation would not happen. While we know a good dentist would not sacrifice his judgment for money, we have truly said that those learned in the sciences sometimes recede from the common and accepted standards of honesty. . . . The decree is affirmed.

CONCLUSION

On the face of the foregoing case, it would seem that the Florida dental act constitutes an effective means of dealing with the phase of indirect dental advertising involved. For the most part, this subject has been approached by legislation defining the practice of dentistry, and enforcement sought thereunder by establishing the illegality of a given practice. This method has not been uniformly successful in suppressing the objectionable features of quasidental advertising.

The Florida act, on the other hand, operates directly on the subject by stipulating those not coming within the dental statute, but denying them, such as dental laboratories, the right to advertise to the general public. This appears to be a forthright way of meeting a difficult situation, and one deserving the attention of all persons interested in sound dental legislation.

1520 East Tenth Street.

APPEAL PROCEDURE UNDER RATION ORDERS

WE have had inquiries from dentists as to what can be done when their requests to ration boards for coupons for gasoline, tires, new automobiles or other commodities are refused in full or in part. In such cases, they can take an appeal from the decision of their rationing board. The Office of Price Administration has adopted a method for taking appeals called Procedural Regulation No. 9, and entitled "Uniform Appeal Procedure Under Ration Orders." The regulation provides that if a request has been made to a local rationing board and the board's action is not satisfactory to the applicant, he shall have the right to take an appeal to the district director. In the OPA regulation, the applicant, when taking an appeal, is sometimes called an appellant and sometimes a respondent.

The portion of the regulation that

provides for the giving of notice of a board's action and for the method of taking an appeal to the district director is as follows:

1300.603. Notice of a Board's action shall be given, either at the Board's office or by mailing, to the person who has the right of appeal or to his agent. The appeal must be brought within thirty days after such mailing or the giving of such other notice.

1300.604. Appeals from the action of a Board shall be to the District Director who has been designated by the Regional Administrator to decide appeals from the decisions of that Board, and shall be brought by the person entitled to bring such appeal, in the following manner:

(a) A statement of appeal shall be filed in duplicate with the Board. The statement of appeal shall be on OPA Form R-122, shall state the basis for the appeal, setting forth the specific section or sections of the ration order claimed to be inconsistent with the action appealed from, and any other facts called for by the form, or deemed by the appellant to be pertinent. The statement of appeal may be accompanied by documentary evidence supporting the appeal.

(b) Within five days of such filing, the Board shall forward one copy of the statement and an explanation of its reasons for taking the action appealed from, together with all pertinent records or papers, to the District Director, unless the Board shall, within such five-day period, upon reconsideration, reverse the action appealed from. If the Board disagrees with the version of the facts contained in the appellant's statement of appeal or in other papers in the record, the Board shall note the respects in which its version of the facts differs.

1300.605. (a) The District Director shall maintain an appeals docket. He shall assign a number to each appeal when it reaches him, and shall enter such number, together with the name of the appellant and the name and number of the Board from whose action the appeal is taken, the action taken on appeal, and the date on which a copy of his decision was mailed to the appellant.

(c) The District Director may, at the request of the appellant, order that a hearing be held on the appeal. The hearing shall be conducted by the District Director or a presiding officer designated by him. The presiding officer shall preside at the hearing, administer oaths and affirmations, and rule on the admission and exclusion of evidence.

(d) Notice of any hearing to be held pursuant to this Regulation shall be served on the respondent not less than three days prior to such hearing. The notice shall state the time and place of the hearing and the purpose for which the hearing is to be held.

(e) Any hearing held pursuant to this Regulation shall be conducted in such manner as will permit the respondent to present evidence and argument to the fullest extent compatible with fair and expeditious determination of the issues raised in the hearing. To this end:

(1) The respondent shall have the right to be represented by counsel of his own choosing.

(2) The rules of evidence prevailing in courts of law or equity shall not be controlling.

(3) The presiding officer, having due regard to the need for expeditious decision, shall afford reasonable opportunity for cross examination of witnesses.

The regulation further provides that the decision of the district director must be in writing and that one copy must be mailed to the appellant. In his decision, the district director may affirm, modify or reverse the action of the local board. If the decision of the district director is adverse, the appellant may take an appeal from the district director to the regional administrator.

The appeal from the district director to the regional administrator is made in practically the same manner as the appeal was from the local rationing board to the district director; that is, it must be filed within thirty days from the date of the decision of the district director, and it must be filed on OPA Form R-122. The district director has five days after the appeal is filed with him in which to reverse his decision, and

if he fails to do so, he in turn forwards a copy of the record to the regional administrator.

The regional administrator may affirm, modify or reverse the decision of the district director, and the decision of the regional administrator must be in writing and a copy must be mailed to the appellant. If the regional administrator renders an adverse decision, the appellant may appeal to the Washington Office of the Office of Price Administration. This appeal is taken in the same manner as the preceding appeals; that is, it must be filed within thirty days from the decision of the regional administrator, and it must be made on OPA Form R-122. After the appeal is filed with him, the regional administrator has five days in which he can reverse his decision if he wishes. If he fails to reverse his decision, he must in turn forward a copy of the record to the Washington Office, which is given the discretion of either passing upon the appeal or refusing to pass upon the appeal.

Thus the appellant may take three appeals; namely, from the local rationing board to the district director; then to the regional administrator, and then to the Washington Office of the OPA. In each case, the appeal is filed on OPA Form R-122, and, in each case, two copies must be filed with the party from which the appeal is taken. In each case, the appellant is required to file a statement of appeal within thirty days after he is notified of the action of the board, or the district director or the regional administrator, as the case may be. In each case, the board, or the director or the administrator, has a period of five days in which to reverse the decision.

The foregoing appeal procedure applies only in case the appellant has applied for a ration order in the first instance and the application has been refused in whole or in part. It does not apply when a ration order has been previously issued and the board is seeking to revoke, or has revoked the ration order for any reason.

GEORGE H. FOX, *Secretary,*
Committee on Legislation.

REPORT OF THE RESEARCH COMMISSION

To the Officers, Board of Trustees and House of Delegates of the American Dental Association:

Among the items that the Commission has in mind for immediate attention after the war, for the Research Fellowship at the National Bureau of Standards is the revision of existing American Dental Association specifications.

A vast amount of work is currently being done in development of new and substitute products. We do not doubt that some of the materials being introduced as "substitutes" will exhibit properties which will make them useful even after the materials that they now replace are again plentiful. New alloys and new resins will probably make their appearance, and it is our desire and purpose that the American Dental Association specifications define the highest type material in each classification.

With the advent of such new materials or the improvement of present ones, the specifications must be modified so that the List of Certified Dental Materials will continue to represent the superior products. However, the Commission does not believe that the present is the proper time to undertake specification revision. It is our belief that the dental research men may work more profitably toward development of necessary substitutes, such as the tinfoil substitute and the alginate impression material which have been announced by the National Bureau of Standards during the past year. The work of the Research Fellowship, though greatly curtailed through the Bureau's war program, and the loan of our Associates to the Bureau for war work, will be directed to such work as this and to the maintenance of the List of Certified Materials.

REPORT OF THE A.D.A. RESEARCH FELLOWSHIP AT THE NATIONAL BUREAU OF STANDARDS

Fellowship of Physical and Chemical Research in Dental Materials

The primary function of the Fellowship for the past year has been the maintenance of the List of Certified Products. A survey of the inlay casting gold alloys on the list was, accordingly, undertaken. Samples obtained of ninety-four alloys were tested for compliance with the specifications, and indicated changes have been made in the list.

Newly certified products tested and found to comply were two dental mercuries and one denture base resin. Some other products were offered for certification, but did not meet the specification requirements and so were rejected.

Among the other projects undertaken was an investigation of the rate of wear of acrylic resin teeth on full dentures in service in the mouth. Preliminary results from short time measurements were reported in THE JOURNAL.

Further work initiated in the precious metals field included (1) determination of the physical properties of and the effect of different heat treatments on a number of representative wrought gold alloy wires (of various precious metals content) as a background for revision of the present specifications and (2) an attempt to develop a satisfactory corrosion (tarnish) test for dental golds.

Because the National Bureau of Standards was turning 100 per cent to war work, the Research Commission, in October, offered the services of the Fellowship personnel to the Director of the Bureau for employment in any war project for which he felt they were qualified. The Bureau took advantage of this offer, and Mr. Caul was transferred to a war project concerning ores, shortly thereafter. This necessitated dropping the work on corrosion of gold alloys for the duration.

Two reports on the behavior of experimental amalgam alloys were requested from the members of the cooperating committee who had made restorations of these materials. The replies were disappointingly few as many cooperators are now in the services, and several others have been unable to contact the patients. The results to date are inconclusive, but indicate that longer service of the restorations will be necessary before a final report on this project can be made.

The Fellowship assisted in the development of the alginate base impression material which was reported in THE JOURNAL, and which may be used in place of the restricted agar base.

Publications from the laboratory have included the following articles:

Beall, J. R.: Wear of Acrylic Resin Teeth (Progress Report). J.A.D.A., 30: 252, February 1, 1943.

Schoonover, I. C., and Dickson, George: Preparation and Characteristics of Elastic Dental Impression Compounds with an Alginate Base. J.A.D.A., 30: 565, April 1, 1943.

Paffenbarger, G. C.; Caul, H. J., and Dickson, George: Base Metal Alloys for Oral Restorations. J.A.D.A., 30:852, June 1, 1943.

Notices have also appeared in the Association Activities Section under the Research Commission.

With the Bureau a prohibited military zone, the visitors to the laboratory have been noticeably fewer than in the past. Visitors from the services and from manufacturers have predominated.

Direct war work at the Bureau has continued to expand; and in February, the director again took advantage of the Commission's offer, and Mr. Beall was assigned (at the Bureau) to a secret ordnance project for the Navy.

However, while research must be laid aside, a program to keep the List of Certified Products accurate and up-to-date has been arranged by the Commission and the Bureau officials. The testing necessary for this and other urgent problems will be handled as occasions arise. Thus, while making a direct contribution to the war work at the National Bureau of Standards, the Fellowship will maintain a fundamental service to the profession through the Lists of Certified Materials.

Respectfully submitted,

JOHN R. BEALL, *Research Associate.*

REPORT OF THE A.D.A. RESEARCH FELLOWSHIP AT THE NATIONAL INSTITUTE OF HEALTH

Fellowship for Biologic Research and Dental Diseases

For the past year, endeavors in the field of ulceromembranous stomatitis have been directed toward the isolation of *Borrelia vincenti,* which has been incriminated as the chief organism in the production of the disease. Animal experiments utilizing pure cultures of *Borrelia vincenti* alone and in combination with its various symbions would be very valuable in attempting to prove or dis-

prove their etiologic relationship to the disease.

At the present time, the results of investigations on the cultivation of *Borrelia vincenti* have been unsuccessful. The organism apparently is very fastidious in its nutritional requirements and it is extremely difficult to obtain it even in mixed cultures of the oral flora. Numerous types of culture media have been utilized in an attempt to isolate this spirochete. Most of the work has centered about a low heat veal heart-hormone-agar used in this laboratory for the cultivation of the smaller oral treponemes. Many types of tissue including human heart and placenta have been used in an attempt to find a better substitute for veal heart. In general, hearts have proved more satisfactory than any other type of animal tissue. Autoclaved media have been found unsatisfactory. Low heat infusions of low agar concentration have yielded the most promising results, and, by such methods, certain growth-promoting factors are apparently retained in the finished medium.

Most of the strains of spirochetes that have been isolated have been found to require a reduced oxygen tension. Sodium formaldehyde sulfoxylate and sodium thioglycolate have been used separately and in combination with cysteine hydrochloride in various concentrations in an endeavor to find a good reducing substance to incorporate in the agar medium. In addition, various substances such as: glycerin, sugars, rice starch, cornstarch, vegetable extracts, washed human fibrin, body fluids, animal tissues, yeast extracts, vitamins and extracts of pure and mixed cultures of various oral organisms have been used as enriching substances.

Pure cultures of small oral treponemes have been utilized in evaluating the growth-promoting qualities of the chorio-allantoic membrane, allantoic fluid, yolk sack and the developing chick embryo in 6-10-day-old eggs. However, such tissues and fluids have been found unsatisfactory for spirochetal growth.

Experimental animals have been inoculated with oral scrapings from cases of Vincent's stomatitis with the hope of maintaining *Borrelia vincenti* in animal tissues. This, too, has met with negative results and only the small oral treponemes, in association with other oral bacteria, have persisted in the resulting oral lesions. Postmortem examination of the heart's blood and internal organs of such animals for traces of *Borrelia vincenti* have been without success.

Some doubt has been expressed as to whether *Borrelia vincenti* constitutes an independent species of oral spirochete. Intracerebral, intratracheal and intraperitoneal inoculations of pure initial subcultures of oral treponemes have been made in mice in an attempt to check this assumption. However, the virulence of these organisms was so low that, up to the present time, no lesions have been produced and the organisms disappear from the sites of inoculation and have not been found in any of the body tissues, so that it has been impossible to check on any morphologic changes in such spirochetes.

The fusiform bacilli and smaller oral treponemes have been isolated and cultivated with a rather uniform degree of accuracy. Considerable advances have been made in the development of a modified technic for rapid routine isolation and mass cultivation of the small oral treponemes. This technic has been applied successfully in normal human mouths, human cases of Vincent's stomatitis, periodontoclasia and cases of black tongue in dogs. The results of these experiments appeared in the July issue of THE JOURNAL.

Respectfully submitted,

E. G. HAMPP,

Assistant Dental Surgeon (R).

The Advisory Committee for Research in Dental Caries is continuing, but, because of war conditions, this Committee has not been very active. Sales of "Dental Caries" continue slowly but periodically. The Commission has set aside fifty copies of the first edition of "Dental Caries," so that they may be distributed to libraries in countries that have suffered greatly from war destruction. Naturally, these books will be distributed when the war is over.

During the month of June, the Executive Board held a very important three-day meeting in Washington, D. C., at which time the Board visited the officials of the National Bureau of Standards and the National Institute of Health. As a result of the Washington meeting, plans for continuing the testing program of dental materials periodically were made. Since our Research Associates are temporarily lent to the government for war research work, it is not possible to test materials as soon as they have been certified. However, at stated periods during the year, our Research Associates will be allowed to test the accumulated materials which will arrive at the National Bureau of Standards. By this method, it is hoped to please every one and to keep the testing program active.

As a result of the war, all non-essential research and all research not directly connected with the war effort are being curtailed. The research work of the American Dental Association naturally feels this trend. However, the Executive Board expects that our program of testing dental materials, and the work being done on Vincent's infection will continue as they are of direct application in the war effort.

Respectfully submitted,
M. D. HUFF, *Chairman,*
DANIEL F. LYNCH, *Secretary.*

LIST OF CERTIFIED DENTAL MATERIALS

(As of December 7, 1943)

ALTHOUGH the program of the Research Commission in cooperation with the National Bureau of Standards had to be curtailed because of war work at the Bureau, checking of certified products has been continued. This, with investigation of substitutes for restricted materials, has constituted the program. Reports on substitutes for tinfoil and hydrocolloidal impression material have appeared in THE JOURNAL, and herewith is presented the latest list of those certified materials which have been found, when tested at the Bureau, to comply with specification requirements.

The list of certified hydrocolloidal impression materials has been included even though they are not now on the market. Availability of agar would undoubtedly see their immediate reintroduction.

Requests for certification are still being received, but verification tests cannot be promised by any specified date. Additions to the lists or deletions therefrom will be published in THE JOURNAL as occasion demands.

In purchasing certified materials for use in dental practice, these lists should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the lists, and for a statement guaranteeing compliance with the specification.

CERTIFIED AMALGAM ALLOYS (A.D.A. SPECIFICATION NO. 1.)

Alloy	Manufacturer and Distributor
Accurate Metalloy (filings)	The L. D. Caulk Co.
Ackerman (filings)	Ackerman Dental Mfg. Co.
Argentum ("A" cut)	Hammond Dental Mfg. Co.
Argentum (fine cut)	
Argentum (medium cut)	
Argentum (shavings)	
Aristaloy	Baker & Co., Inc.
Banner (filings)	Goldsmith Bros. S. & R. Co.
Blue Diamond (filings)	Reliance Dental Mfg. Co.
Brewster Medium (shavings); Quick (filings); Quick (shavings)	E. R. S. Brewster
Capeako (filings)	Precious Metals Refining Works
Certified	Lee S. Smith & Son Mfg. Co.
Coe	Coe Laboratories, Inc.
Cresilver	Crescent Dental Mfg. Co.
Dee (filings)	Thomas J. Dee & Co.
Dentserve	Dentists Supply Service
Diamond Edge	Young-Baker & Co.
Excel	Daniels Dental Alloy Co.
Fellowship, New	Dental Protective Supply Co.
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting and Refining Co.
Gold Bond	Jefferson Laboratories
Lustraloy, Regular	A. Pfingst
Lustraloy Cut T	
Minimax (filings) 173, 177, 178, 183 (shavings) 177, 178	The Minimax Co.
Minimax White Gold & Platinum	
Mission No. 5	Henry F. Bruce Co.
Mission No. 5 ("A" cut)	
Mission No. 6	
Modeloy (Quick Setting) (filings)	Crescent Dental Mfg. Co.
Moyco Higrade	The J. Bird Moyer Co.
Mynol Improved	Mynol Chemical Co.
New Deal	Miller Dental Co.
Ney-Aloy	The J. M. Ney Co.
Ney's No. 125	
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. S. & R. Co.
Preferred C	Precious Metals Refining Works
Preferred D	
Research Oralloy	Precious Metals Research Works, Inc.
Royal Special—First Setting	Garhart Dental Specialty Co.
Royal Super—First Setting	
Silver Crown	General Refineries, Inc.
Silver Crown (medium)	
Silverloy (filings), Silverloy (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting & Refining Co.
S-C Medium (filings); S-C Quick (filings)	Stratford-Cookson Co.
S-R	Lee S. Smith and Son Mfg. Co.
Standard	Standard Dental Products Co.
True Dentalloy (filings)	The S. S. White Dental Mfg. Co.
True Dentalloy (cut "A")	
Twentieth Century (regular)	The L. D. Caulk Co.
Twentieth Century (special)	
Uniform	Henry Nelms & Son
Vertex	Vertex Dental Products Co.
White Beauty	Lang Dental Mfg. Co.

CERTIFIED INLAY CASTING INVESTMENTS (A.D.A. SPECIFICATION NO. 2.)

Investment	Manufacturer or Distributor
Coecal Inlay	Coe Laboratories, Inc.
Coecal Universal	
Kerr Christobalite-Inlay	Kerr Dental Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Ransom and Randolph Green	
S. S. White Inlay No. 20	The S. S. White Dental Mfg. Co.
Security Improved Inlay	The Cleveland Dental Mfg. Co.
Steele's-Super	The Columbus Dental Mfg. Co.

CERTIFIED IMPRESSION COMPOUNDS (A.D.A. SPECIFICATION NO. 3.)

Compound	Type	Manufacturer or Distributor
Certified	I	Lee S. Smith & Son Mfg. Co.
Kerr Perfection	I	Kerr Dental Mfg. Co.
Kerr No. 2 Soft Green	I	
Mizzy—Low Heat	I	Mizzy, Inc.
Moyco Special	I	The J. Bird Moyer Co.
S. S. White—Black—Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED INLAY CASTING WAXES (A.D.A. SPECIFICATION NO. 4.)

Wax	Manufacturer or Distributor
Caulk-Blue	The L. D. Caulk Company
Kerr-Blue—Hard	Kerr Dental Mfg. Co.
Maves Green	The Heidbrink Co.
Security	The Cleveland Dental Mfg. Co.
Sterling	Baker & Co., Inc.
Taggart's Green	Mizzy, Inc.

CERTIFIED INLAY CASTING GOLD ALLOYS (A.D.A. SPECIFICATION NO. 5.)

Alloy Type A, Soft	Manufacturer or Distributor
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Bruce "A"	Henry F. Bruce Co.
Bruce No. 1	
Chilcast No. 1	Vernon-Benshoff Co.
Crown Inlay No. 2 Soft	General Refineries, Inc.
Crown K	
Deeone	Thomas J. Dee and Co.
Goldsmith Inlay No. 1	Goldsmith Bros. S. & R. Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Krause Soft Inlay	Krause Gold Refinery
Research-A-Soft	Precious Metals Research Works, Inc.
Spyco Soft	Spyco Smelting & Refining Co.
S. S. White No. 2	The S. S. White Dental Mfg. Co.
S. S. White No. 900	
S. S. White No. 940	
Stern No. 3375 (Stern S, Soft)	I. Stern & Co.
Williams No. 3	The Williams Gold Refining Co., Inc.
Williams Will-Cast 22	

Alloy Type B, Medium	Manufacturer or Distributor
Aderer-B-Medium	Julius Aderer, Inc.
Baker Inlay Medium	Baker and Co., Inc.
Bruce "O"	Henry F. Bruce Co.
Bruce No. 2	
Chilcast No. 1-A	Vernon-Benshoff Co.
Chilcast 1-M	
Chilcast No. 2	
Chilcast No. 2-A	
Chilcast 2-M	

Crown Inlay No. 1 Hard	General Refineries, Inc.
Crown Knapp No. 2	
Crown T	
Deetwo	Thomas J. Dee and Co.
Goldsmith Inlay No. 2 Medium	Goldsmith Bros. S. & R. Co.
Jelenko Modulay	J. F. Jelenko & Co., Inc.
Jelenko Plaincast	
Krause Hard Inlay	Krause Gold Refinery
Nelms E	Henry Nelms & Son
Ney-Oro A-1	The J. M. Ney Co.
Ney-Oro A-10	
Spyco Medium	Spyco Smelting & Refining Co.
S. S. White No. 1	The S. S. White Dental Mfg. Co.
S. S. White No. 5	
S. S. White No. 820	
Stern No. 3290	I. Stern & Co.
Stern No. 6219 (Stern 1, Med. Inlay)	
Tinker No. 1	Spyco Smelting & Refining Co.
Tinker Inlay	
Wildberg "A"	Wildberg Bros. S. & R. Co.
Williams Pioneer	The Williams Gold Refining Co., Inc.
Williams Special Inlay	

Alloy	Type C, Hard	Manufacturer or Distributor
Aderer-C-Hard		Julius Aderer, Inc.
Aderer "Dressel"		
Baker Hard Inlay		Baker & Co., Inc.
Chilcast No. 2		Vernon-Benshoff Co.
Chilcast No. 2-H		
Crown No. 9		General Refineries, Inc.
Crown Knapp No. 3		
Crown Supreme Inlay		
Crown T T		
Deesix		Thomas J. Dee and Co.
Goldsmith Inlay No. 3 Hard		Goldsmith Bros. S. & R. Co.
Jelenko Durocast		J. F. Jelenko & Co., Inc.
Jelenko Firmilay		
Research Hard Cast No. 5		Precious Metals Research Works, Inc.
Spyco No. 6		Spyco S. & R. Co.
Stern A. T. (2381)		I. Stern & Co.
Stern 3337		
Stern 3465		
Stern H (6485)		
Tinker No. 1 H		Spyco S. & R. Co.
Tinker No. 2		
S. S. White No. 8		The S. S. White Dental Mfg. Co.
S. S. White No. 13		
S. S. White No. 860 Hard		
Wildberg "C"		Wildberg Bros. S. & R. Co.
Williams Klondiker		The Williams Gold Refining Co., Inc.
Williams Special "Four"		

CERTIFIED DENTAL MERCURIES (A.D.A. SPECIFICATION No. 6.)

Mercury	Manufacturer or Distributor
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association

Chemically Pure	The S. S. White Dental Mfg. Co.
Crown	General Refineries, Inc.
Dee	Thomas J. Dee & Co.
Dental	Goldsmith Bros. S. & R. Co.
Dental, C. P.	F. W. Berk & Co., Inc.
Excel	Daniels Dental Alloy Co.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield S. & R. Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Mercury Laboratories	Mercury Laboratories, Inc.
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Moyco	The J. Bird Moyer Co.
Mynol	Mynol Chemical Co.
Ney's C. P.	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
R. P. C.	Research Products Corporation
Spectropure	Baker & Co., Inc.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass.)

CERTIFIED WROUGHT GOLD WIRE ALLOYS (A.D.A. SPECIFICATION NO. 7.)

Alloy	Manufacturer or Distributor
Aderer No. 1	Julius Aderer, Inc.
Aderer No. 3	
Aderer No. 4	
Aderer No. 20 Clasp	
Baker 21	Baker & Co., Inc.
Baker Q. A.	
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Thomas J. Dee & Co.
High Fusing Clasp	Goldsmith Bros. S. & R. Co.
Jelenko No. 3 Wire	J. F. Jelenko & Co., Inc.
Jelenko Super Wire	
Medium Clasp	Goldsmith Bros. S. & R. Co.
Ney-Oro Elastic No. 4	The J. M. Ney Co.
Neydium 9	
Regular Clasp	Goldsmith Bros. S. & R. Co.
Spyco No. 2	Spyco Smelting and Refining Co.
Spyco No. 4	
Stern No. 2657	I. Stern and Co., Inc.
S. S. White No. 12	The S. S. White Dental Mfg. Co.
S. S. White No. 61 Metalba	
Williams No. 1 Super	The Williams Gold Refining Co., Inc.
Williams No. 2 High Fusing Clasp	
Williams No. 3 High Tensile	
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.

CERTIFIED ZINC PHOSPHATE CEMENTS (A.D.A. SPECIFICATION NO. 8, First Revision)

Cement	Manufacturer or Distributor
Ames Z-M	The W. V-B Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge	The L. D. Caulk Co.
Caulk Petroid Improved	
Caulk Tenacin	

Certicem	Lee S. Smith and Son Mfg. Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Dental Crown Bridge and Inlay	Lang Dental Mfg. Co.
Moyco Adamant	The J. Bird Moyer Co., Inc.
Moyco Inlay Crown and Bridge	
Moyco White Copper	
S-C	Stratford-Cookson Co.
Smith's	Lee S. Smith and Son Mfg. Co.
S. S. White Silver Improved	The S. S. White Dental Mfg. Co.
S. S. White Zinc	
S. S. White Zinc, Improved	

CERTIFIED SILICATE CEMENTS (A.D.A. SPECIFICATION No. 9.)

Cement	Manufacturer or Distributor
Ames Plastic Porcelain	The W. V-B Ames Co.
Astralit	Premier Dental Products Co.
Baker Plastic Porcelain	Baker & Co., Inc.
DeTrey's Synthetic Porcelain	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel, Improved	Lee S. Smith & Son Mfg. Co.
S. S. White Filling Porcelain, Improved	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS (A.D.A. SPECIFICATION No. 11.)

Material	Manufacturer or Distributor
Deelastic	Thomas J. Dee and Co.
Dentocoll	The L. D. Caulk Co.
Kerr Hydro-Colloid	Kerr Dental Mfg. Co.
Perfectocoll	Baker & Co., Inc.
Plasticoll	Lee S. Smith & Son Mfg. Co.
S. S. White Elastic Colloid	The S. S. White Dental Mfg. Co.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE RESINS (A.D.A. SPECIFICATION No. 12.)

Material	Form	Certified by
Acralite	Clear, powder-liquid	Acralite Co., Inc.
Acralite	Pink, powder-liquid	
B-B	Clear, powder-liquid	Bell Dental Products Co.
B-B	Pink, powder-liquid	
Coralite	Pink, powder-liquid	Coralite Dental Products Co.
Densene	Clear, powder-liquid	Cosmos Dental Products, Inc.
Densene	Pink, powder-liquid	
King's	Pink, powder-liquid	Alfred T. King
Lang's	Pink, powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear, plastic cake	The L. D. Caulk Co.
Lucitone	Clear, powder-liquid	
Lucitone	Pink, plastic cake	
Lucitone	Pink, powder-liquid	
Luxene 44	Pink, plastic cake	Luxene, Inc.
Marvel	Pink, powder-liquid	Marvel Dental Products Co.
Stryker's	Pink, powder-liquid	Stryker's Dental Products, Inc.
Vernonite	Clear, plastic cake	Vernon-Benshoff Co.
Vernonite	Pink, plastic cake	
Vernonite	Pink, powder-liquid	
Vita-Lite	Clear, powder-liquid	Vita-Lite Products Co.
Vita-Lite	Pink, powder-liquid	

REPORTS OF RELIEF FUND COMMITTEE AND RELIEF COMMISSION*

To Officers, Board of Trustees and House of Delegates:

This year, rather than prepare separate short reports for each the Relief Commission and Relief Fund Committee, a more nearly complete and comprehensive summary is attempted in this outline. The year has been a very busy, but rather uneventful one, since we had no floods or other catastrophes within our own confines and the ravaging effect of the war has not really come home to our membership yet, with one exception: a member who practiced in one of our possessions is, as far as is known, being held a prisoner by the Japanese. His wife and five children returned to this country and are being assisted by the Relief Fund.

We are happy to announce that the estate of one member who died the month following the expiration of his relief grant has found it possible to offer a refund to the American Dental Association and the state of which he was a member to the full amount of his relief payments. Also, one of our younger members receiving help was able to resume his practice and voluntarily canceled future payments on his own grant.

The Relief Fund Committee, in spite of the fact that many of our young members now in the service were not able to make sizable contributions, is happy to report one of its banner years in collection, the increase this year over last being more than $4,000. The committee wishes to give much of the credit to the state associate members, who, through their years of experience and state organizations, have done an excellent job. It is most fortunate that these associate members are selected through the Relief Fund Committee and are not subject to replacement with each change of the state administrations. Time and space do not permit the printing of the many, many letters received from contributors and recipients alike expressing their gratitude for membership in this fine organization. The following data are submitted for your study and consideration.

The members of the Relief Commission and the Relief Fund Committee wish to thank the Officers and Trustees of the American Dental Association and likewise the officers and committeemen of the states for their sincere cooperation. We especially appreciate the help given us by Dr. Pinney and other members of the official family at the Central Office.

Respectfully submitted,
E. E. GRAHAM, *Secretary*,
Relief Commission.

*At the 1943 meeting of the House of Delegates, the Relief Fund Committee and the Relief Commission were combined into the Relief Commission, with the following personnel: Fred R. Adams, Chairman, New York, N. Y.; E. E. Graham, Secretary, 55 Washington St., Chicago, Ill.; R. Holmes Mason, Macon, Ga.; Charles P. Grosby, St. Louis, Mo.; Walter S. Thompson, Los Angeles, Calif.; John S. Owens, Camden, N. J.

CHRISTMAS SEAL RECEIPTS

States	1941-1942	1942-1943	Increase	Decrease	Per Capita 1942-1942	Per Capita 1942-1943
1. Alabama	$ 543.39	$ 640.00	$ 96.61		$1.35	$1.49
2. Arizona	85.00	88.00	3.00		0.86	0.93
3. Arkansas	67.60	88.50	20.90		0.28	0.34

4. Army	1,114.00	225.50		$ 888.50	2.62	0.86
5. California	912.00	1,033.53	121.53		0.50	0.55
6. Southern California	1,127.00	1,229.60	102.60		0.58	0.58
7. Colorado	176.00	278.50	102.50		0.36	0.53
8. Connecticut	811.00	1,188.65	377.65		0.84	1.17
9. Delaware	46.00	38.00		8.00	0.63	0.49
10. District of Columbia	713.00	688.00		25.00	1.57	1.55
11. Florida	321.00	371.00	50.00		0.61	0.70
12. Foreign		2.00	2.00			0.17
13. Georgia	195.25	243.00	47.75		0.45	0.45
14. Hawaii	86.50	132.00	45.50		0.46	0.71
15. Idaho	44.50	48.50	4.00		0.39	0.43
16. Illinois	2,607.10	2,685.85	78.75		0.55	0.54
17. Indiana	631.00	678.75	47.75		0.50	0.49
18. Iowa	642.75	698.50	55.75		0.54	0.56
19. Kansas	278.65	358.00	79.35		0.43	0.53
20. Kentucky	322.50	665.00	342.50		0.56	1.11
21. Louisiana	161.00	155.50		5.50	0.35	0.31
22. Maine	105.00	131.00	26.00		0.42	0.51
23. Maryland	302.00	344.50	42.50		0.58	0.63
24. Massachusetts	766.02	964.50	198.48		0.35	0.41
25. Michigan	766.00	930.00	154.00		0.39	0.44
26. Minnesota	770.60	810.00	39.40		0.43	0.45
27. Mississippi	124.50	150.30	25.80		0.49	0.55
28. Missouri	1,527.25	2,095.75	568.50		1.07	1.37
29. Montana	133.10	129.50		3.60	0.62	0.57
30. Navy	71.00	121.00	50.00		0.30	0.60
31. Nebraska	303.28	361.10	57.82		0.51	0.58
32. Nevada	11.50	7.00		4.50	0.24	0.13
33. New Hampshire	108.00	97.00		11.00	0.65	0.57
34. New Jersey	973.70	1,130.00	156.30		0.46	0.50
35. New Mexico	64.00	62.00		2.00	0.62	0.59
36. New York	3,826.00	4,884.75	1,058.75		0.66	0.71
37. North Carolina	393.91	426.00	32.09		0.66	0.70
38. North Dakota	110.15	87.85		22.30	0.61	0.47
39. Ohio	1,261.60	1,413.50	151.90		0.47	0.50
40. Oklahoma	192.00	202.00	10.00		0.39	0.39
41. Oregon	274.55	257.05		17.50	0.52	0.50
42. Panama Canal Zone	15.00	25.00	10.00		0.68	0.40
43. Pennsylvania	1,732.90	1,979.75	246.85		0.45	0.46
44. Public Health Service	61.50	58.00		3.50	0.45	0.42
45. Puerto Rico	24.00	35.10	11.10		0.31	0.23
46. Rhode Island	112.50	120.00	7.50		0.40	0.43
47. South Carolina	68.00	94.00	26.00		0.31	0.45
48. South Dakota	57.15	73.00	15.85		0.33	0.41
49. Tennessee	565.50	426.50		139.00	1.00	0.70
50. Texas	555.00	705.25	150.25		0.40	0.49
51. Utah	278.50	262.00		16.50	1.14	1.09
52. Vermont	28.00	42.00	14.00		0.25	0.34
53. Vet. Administration	85.00	73.50		11.50	0.77	0.62
54. Virginia	302.50	400.00	97.50		0.55	0.63
55. Washington	412.93	501.00	88.07		0.52	0.61
56. West Virginia	215.00	393.50	178.50		0.55	0.96
57. Wisconsin	581.60	635.00	53.40		0.37	0.38
58. Wyoming	45.00	63.00	18.00		0.47	0.64
59. Commercial Houses	408.00	469.14	61.14			
	$28,527.48	$32,496.92	$ 5,127.84	$ 1,158.40		
		28,527.48	1,158.40			
		$ 3,969.44	$ 3,969.44			

SUMMARY OF CHRISTMAS SEAL FUND OPERATION

Year	Granted	Paid	No. Applicants	Seal Receipts
1934-1935	$ 4,655.96	$ 4,298.60	23	$15,574.97
1935-1936	9,469.52	5,856.96	43	18,389.32
1936-1937	10,118.70	8,125.63	50	20,739.87
1937-1938	10,841.00	9,949.10	57	23,873.54
1938-1939	14,828.96	12,345.16	72	23,152.65
1939-1940	13,960.00	13,694.80	72	23,966.84
1940-1941	12,531.40	11,955.20	63	25,297.71
1941-1942	15,198.40	13,439.10	68	28,527.48
1942-1943	15,657.00	12,474.75	73	32,496.92
9 year increase	$11,001.04	$ 8,176.15	50	$16,921.95

PAST PRESIDENT'S ADDRESS

G. WALTER DITTMAR, D.D.S., Chicago, Ill.

IN the past, it has been the custom for speakers at this luncheon to devote their remarks to a review of the outstanding events of their administration as President of the American Dental Association and I shall attempt to follow their example.

Nineteen thirty-three was my year as President of the American Dental Association, a year never to be forgotten. The depression reached its lowest depth. Banks failed, stocks crashed. The birth of the National Recovery Administration and its blue eagle was followed by the now alphabetical family.

But, in spite of the gloom and darkness, there were clouds with silver linings. The City of Chicago had reached the centennial of its incorporation and was celebrating with a century of progress exposition, a mammoth world's fair. The American Dental Association had reached its seventy-fifth year and planned to celebrate its diamond jubilee. A new organization, known as the Chicago Centennial Dental Congress, had been formed with the late Arthur D. Black as president and Stanley D. Tylman as secretary. This organization submitted a plan to the House of Delegates of the American Dental Association proposing that they combine their efforts in presenting a joint meeting of the two organizations in Chicago. This proposition was accepted, and it was decided that each organization would present its own program.

The program committee of the American Dental Association was headed by P. G. Puterbaugh and that of the Chicago Centennial Dental Congress by Charles W. Freemen.

Dentistry's exhibit at the Century of Progress Exposition was largely the work of the Chicago Centennial Dental Congress, although the committees of the American Dental Association aided in its preparation and maintenance. Dr. Black deserved outstanding credit for its great success. The Congress concerned itself with the pictorial history and material advancement of dentistry, while the American Dental Association continued to carry on the professional, educational, legislative and business aspects of our profession as it had for the preceding seventy-five years.

*Presented before the Past Presidents' (American Dental Association) Luncheon Club, Cincinnati, Ohio, October 12, 1943.

Dentists the world over, however, will remember with pride the dental exhibit in the Hall of Science at the Chicago Exposition. It was educational. It was dramatic. It was calculated to stimulate the public to an interest in dentistry.

We of the American Dental Association staff had been working toward similar ends during the preceding year. Six new activities were undertaken or promoted during my administration and several of the following came to fruition during my year in office. Committees were established under the following heads:

1. Dental Health Survey.
2. Dental Educational Publicity.
3. Organization and Membership.
4. American Dental Foundation, Inc.
5. Dental Economics.
6. National Board of Dental Examiners.

I shall refer to them in the order given.

The Dental Health Survey was the culmination of a resolution offered by Homer C. Brown at the Buffalo meeting and adopted by the House of Delegates. A full report of this important activity is given in the President's Address and Reports of the President, also the late Dr. Messner's report published in the *Transactions of the Seventy-Fifth Annual Session of the American Dental Association* under the title "Report of the Committee for Dental Health Survey."

The Committee on Dental Health Survey, organized to determine the dental health needs of the public, was composed of twenty-nine members representative of the professional, educational, legislative and civic phases of dentistry. Dr. Messner, of Washington, was chairman and worked in cooperation with Surgeon General Cumming, head of the U. S. Public Health Service. The first work undertaken was a survey of the existing dental health service in state, municipal and county public health organizations and educational institutions, a first step toward providing them with better dental health service.

The Committee on Dental Educational Publicity, headed by C. Willard Camalier, also worked in conjunction with the U. S. Public Health Service. Dental health messages were prepared for the press. The radio programs and lectures of the Bureau of Public Relations of the American Dental Association were submitted to the Public Health Service for approval, and thereafter given to the public with its official indorsement. We believed and, as time has shown, correctly that newspapers and radio would be glad to cooperate in health publicity so indorsed. I recall the satisfaction that I felt when I read Dr. Camalier's message of June 12, 1933:

> Arrangements are progressing in a most satisfactory manner for broadcasting dental educational messages over a gigantic hookup.

The Committee on Organization and Membership under the leadership of the late Albert R. Ross, of Indiana, had a serious problem to face. The depression had quite naturally begun to affect the roster of membership, and the answer to that deficit was met in Dr. Ross' well-known "Indiana Plan," providing for an annual membership contest among the constituent dental societies. The Indiana Plan is now known as the American Dental Association Membership Plan. The General Secretary, H. B. Pinney, just the other day gave me a statement showing that the 1933 membership was the lowest in fifteen years, a total of 30,231. On September 1, 1943, the members numbered 56,860, and it is expected that, by the end of 1943, the membership will be more than 58,000, a most gratifying result. In all likelihood, we have about reached the peak. However, the remarkable increase is due to the work of the Committee and the hearty cooperation of the Central Office, THE JOURNAL and Dr. Pinney and the Editor, L. P. Anthony.

The American Dental Foundation, Inc., was organized to secure philanthropic contributions to further dental science. Edward H. Bruening, of Omaha, was its sponsor. Its first board of directors consisted of C. N. Johnson, Harvey J. Burkhart, C. E. Rudolph and George B. Winter, a group of men whose very names gave confidence. The suggested beneficiaries of the foundation were dental research, child welfare, dental education, dental libraries, dental publications and the Central Office of the American Dental Association. It was hoped that, with an agency authorized to bid for gifts and with power to disburse them, dental science would receive its just share of the donations made, which up to that time had not been the case. In spite of the generosity of such people as the Forsyth brothers, of Boston, Eastman, of Rochester, Rosenwald, of Chicago, the Carnegie Foundation, the Guggenheim Foundation, Mrs. Helen S. Carter, of Honolulu, Col. Joseph Samuels, of Providence, and others, only about one-half of 1 per cent of donations made went to dentistry. This was probably due to the fact that the American Dental Association had no authorized agency to bid for donations. We now have the American Dental Foundation, Inc.

The Committee on Dental Economics, with W. O. Talbot as chairman, was formed to improve the economic standing of dentists as well as that of our organization. It was as helpful, I believe, as any fact-finding survey can be in the problem of making a comfortable and useful living.

The National Board of Dental Examiners was organized on a par with the National Board of Medical Examiners as a first step in establishing reciprocity in dental licensure throughout the United States. Until the time when the examinations of the National Board are recognized throughout the country, it will act only in an advisory capacity to the state examining boards. The first examination was offered by this board May 26-27, 1933, in Chicago, Minneapolis, Iowa City and Pittsburgh, covering the first two years of dental college work. Eighty-two students qualified for and took the examination.

One cherished ambition of mine, namely the transfer of the *Journal of Dental Research* to the American Dental Association, was never entirely realized. As necessary to science as is research is the publication of the findings of that research, and the *Journal of Dental Research* under the editorship of William J. Gies enjoyed an excellent reputation for research scholarship. When I learned that it could be procured by an organization without restriction as to personnel or monies, we entered into negotiations with the board of the *Journal of Dental Research* for transfer to the American Dental Association. Unfortunately, all the obstacles could not be ironed out to the satisfaction of both parties, and the *Journal of Dental Research* continued its independent course until it was secured later by another organization. This much was accomplished, however: the American Dental Association was reminded of its need of a publication for research and later provided for extra JOURNAL space by publishing a midmonthly issue of the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

The Committee on Legislation and Correlation was so active and helpful during my administration that I am prompted to incorporate a paragraph from my report to the House of Delegates relative to the activities of this committee, as follows:

> The JOURNAL has kept you informed on much of the activity of this committee, and the proceedings of the Board of Trustees and the Reports of Officers and Committees of the American Dental Association, which you have read, presenting an extensive and

most interesting report of its accomplishments. Therefore, it seems needless for me to dwell further on this subject. I cannot, however, pass it without commenting briefly on my personal contacts with it and on the exceptional loyalty to duty and the tireless effort of this committee to serve our Association efficiently. I am certain that few of you can realize the immense amount of time, effort and continual alertness that the chairman, Dr. Homer C. Brown, has given in behalf of matters both organizational and legislative that would affect the welfare of the dental profession and the general public. It was my privilege to make two trips to Washington with Dr. Brown on matters pertaining to our association and profession. I was greatly impressed by his genius at making contacts with the leaders of the nation in order to bring about desired results. I consider this committee one of the most valuable elements in our association. Only officers and committees, who during the year have kept in touch with the chairman, can realize the gigantic task which it undertook. Hundreds of letters and reports were received by me from Dr. Brown dealing with questions and conditions some of which will be submitted in his report this morning. I am happy to voice my deep personal appreciation of the earnest, efficient service rendered to the American Dental Association by this committee and especially by its able chairman, Dr. Brown.

I have in the foregoing very briefly mentioned the more notable achievements of my administration. However, a perusal of the address and reports previously referred to in the *Transactions of the Seventy-Fifth Annual Session of the American Dental Association* will show other activities of interest and the mention of many outstanding men and messages received from them, including a special message from the President of the United States. To dwell further on these would make this presentation too long.

Before closing, I desire to give credit and special thanks to the men who gave me so much excellent advice and assistance throughout my administration; in particular, Harvey J. Burkhart, Donald M. Gallie, Homer C. Brown, Thomas B. Hartzell and C. Willard Camalier. Also the late W. H. G. Logan, C. N. Johnson and Colonel Messner. I grieve with you in the loss to this club through death of four of our Past Presidents since I last met with them and some of you in St. Louis in 1938—W. H. G. Logan, John P. Buckley, George B. Winter and Martin Dewey. Let us pause a moment in respect to their memory.

30 North Michigan Avenue.

HIGHLIGHTS OF THE 1944 MIDWINTER MEETING of the CHICAGO DENTAL SOCIETY

THE 1944 Midwinter Meeting of the Chicago Dental Society will be held at the Palmer House, Chicago, February 21-23. The Registration Desk will be open Sunday, February 20, from 2:00 to 5:00 p.m., to register dentists residing in the metropolitan area and all out of town dentists who arrive in Chicago that day, and every day thereafter from 8:30 a.m. to 5:00 p.m. A registration fee of $2 will be charged all nonmembers of the society.

The commercial exhibits will open Monday morning, February 21, at 9:00 a.m. and will remain open every day until 6:00 p.m.

No social functions have been scheduled, the meeting being arranged on a strictly wartime basis. Although the meeting this year has been condensed into three days, there will be no curtailment of any of the chief activities, those that were previously held on the fourth day being presented Monday morning.

SPECIAL DAYS

Monday, the first day of the meeting, has been designated "Horace Wells Centenary Day," and commemoration ceremonies in honor of the discoverer of anesthesia will be conducted as a part of the first general session of the meeting Monday evening. Another feature of this evening's session will be the reading of the paper awarded first prize in the Third Annual Prize Essay Competition.

The second day of the Meeting, Washington's Birthday, has been designated Army and Navy Day. During the day, dental officers from Camp Grant, the Sixth Service Command and the Great Lakes Naval Training Station will be present to participate in the general clinics.

The second general session of the meeting, which will be conducted that evening, will feature the ranking officers of the Dental Corps of both the Army and the Navy.

Among the officers who will speak at this session are Maj. Gen. R. H. Mills, Rear Adm. Alexander G. Lyle, Capt. C. Raymond Wells and Maj. Kenneth R. Cofield.

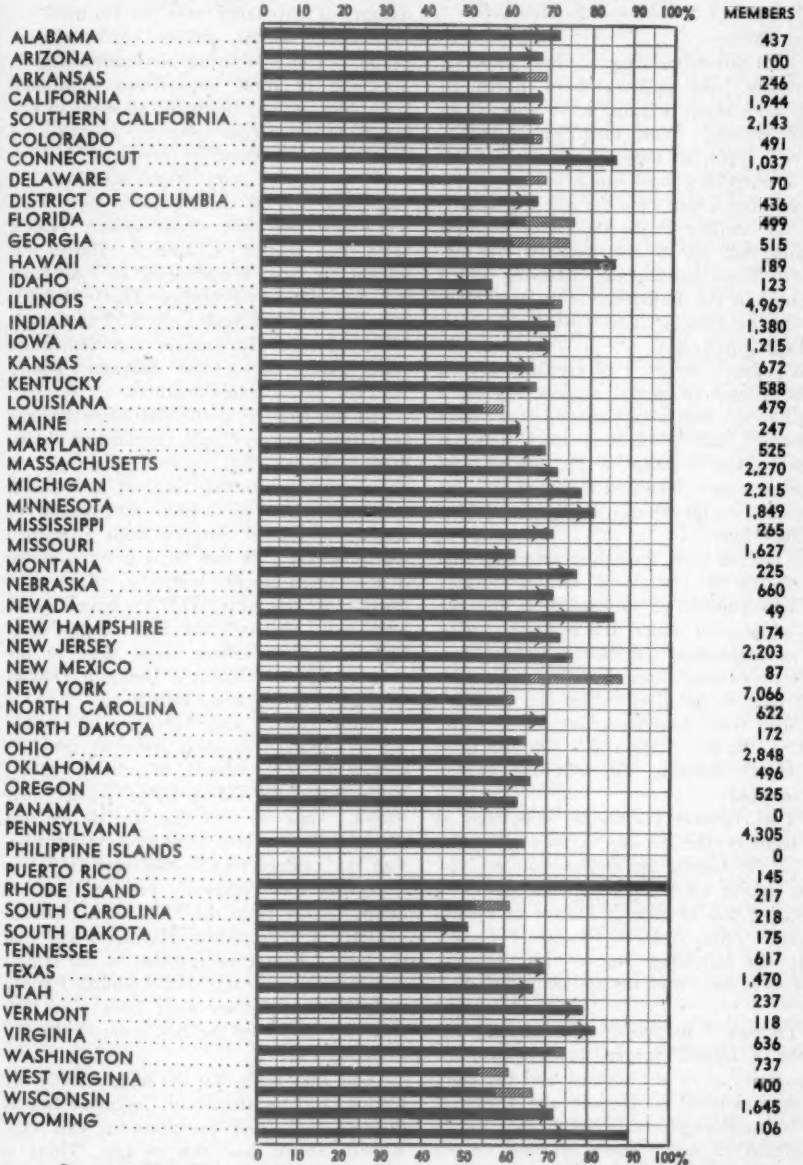
SCIENTIFIC PROGRAM

The scientific program will include essays, limited attendance clinics, general clinics and question and answer periods. The last feature was so successful at the 1943 meeting that it is being repeated, in response to popular demand. Oral surgery, orthodontia, children's dentistry, practice management, periodontia, research, full dentures, partial dentures, crown and bridge work and operative dentistry will be covered in all sessions of the program.

Outstanding essayists and clinicians from coast to coast have already forwarded their acceptances, so the 1944 Midwinter Meeting bids fair to be a classic.

Membership Page

PERCENTAGE OF DUES RECEIVED IN CENTRAL OFFICE AS OF NOVEMBER 30, 1943, AS COMPARED TO 1942 MEMBERSHIP



Percentage based on dental population figures supplied by the State Society Secretaries.

1943 percentage 1942 percentage

CORRESPONDENCE

THE FIRST VALID D.D.S. DEGREES

To the Editor:

IN the November issue of THE JOURNAL, under the joint authorship of Loren B. Taber and Mary B. Lins, there appears an article entitled "The First Valid D.D.S. Degrees" (pp. 1691-1696).

It is surprising how much of our literature is missed, and as those not acquainted with the subject might be under the impression that all of the material was examined, I am sending the following which appeared in the *Bulletin of the Dental Society of the State of New York* for November 1937 (pp. 51-90).

On pages 71 to 75, I covered the subject of the doctor of dental surgery degree, a contribution which apparently has been overlooked, and as there is much material therein which pertains to the subject and which was not mentioned, I request, for historical completeness, the privilege of quoting it here:

"It was at this, their first meeting, that the degree of Doctor of Dental Surgery was first considered. Included in the by-laws as adopted under Article I, Section 10 was an 'Examining Committee,' whose duty it was to examine applicants for such a degree; this to be given when the Society's diploma was conferred on each man. *(Am. J. D. Sc.,* 1:165-166.) On the third day of the meeting, the following motion was adopted:

" 'That Eleazar Parmly be appointed as the agent of the Society to present a petition to the Legislature of the State of New York, asking for a charter, with power of conferring the Degree of Doctor of Dental Surgery.' *(Am. J. D. Sc.,* 1:169.)

"In the following issue of *The Journal,* there is to be found the following information:

" 'FIFTHLY: The subject of conferring the degree of Dental Surgery has engaged the early attention of the society, and the committee appointed to prepare the Diploma, and its appropriate seal, has already nearly completed its task. Every member of the society, honorary as well as active, will be entitled to a Diploma by paying into the treasury a stipulated sum, to be used for the benefit of the society. Although the simple act of conferring a scientific degree, does not of itself impart any additional knowledge, it may be made, at least, an evidence of knowledge already acquired by theory and confirmed by practice.'

"It seems that some of the members immediately availed themselves of this privilege and used the abbreviations D.D.S. after their names. Chapin A. Harris was among the first, it appearing in *The Journal* for January-February 1841 (1:198); likewise Ludolph and Levi S. Parmly (1: 280). Horace Hayden, in the September issue 1841 (11:1), and Solyman Brown (p. 120) were among the others.

"In the charter of the Baltimore College of Dental Surgery, the application being made late in 1839 (granted February 1, 1840), that institution, the first of its kind, was authorized to confer the degree of Doctor of Dental Surgery, both as earned and honorary (the first being granted at the first commencement, March 9, 1841). The initials of this title, D.D.S., have always been used, although the Latin degree conferred by that college from 1841 to the present time is Chirurgie Dentium Doctor, the initials of which are C.D.D.

"Both Harris and Hayden, in signing Robert Arthur's diploma given by the Baltimore College (dated March 9, 1841), made use of the D.D.S. illegally after their names. Thus we find that this degree was in use in the Society some seven months before the College legally conferred it.

"Harris did eventually receive the academic D.D.S. from the Philadelphia Dental College in 1854, while Hayden never had the dental degree except that of the American Society. Eleazar and Ludolph Parmly and Solyman Brown were later given the honorary degree of the Baltimore College in February 1842.

"One thus finds that the suggestion of the College and the degree of Doctor of Dental Surgery had their inception in this city. Robert Arthur had this to say: 'There is one fact connected with the organization of this school (Baltimore College of Dental

Surgery) known to but few persons. It was not originally contemplated by Dr. Harris that the degree of D.D.S. should be conferred. He was persuaded to introduce this feature by a friend.' *(D. Cosmos,* 17:232, 1875), because it was already in use in an unwarranted way, as I will shortly explain, but it had already attained professional status when it was conferred in New York City, and today it is given by nearly all the dental colleges in this country, the other degree being the D.M.D.

"By the time the second meeting was held in Philadelphia, Aug. 10-12, 1841, it was thought that the committee would have accomplished its task and that the charter would have been obtained. In a notice sent to the members, I find: 'Indeed, so few, and so reasonable are the powers and privileges requested in this charter, that the success of the application is scarcely problematical.' (1:194.) In the next issue there is a notice that the diplomas of the American Society of Dental Surgeons 'are now ready for delivery to the members.' (1:290.) A few years ago I received one of these diplomas which was presented to Frederick H. Clark, dated March 8, 1841, signed by Hayden and Brown, but not conferring any degree or title. Dr. Lawrence P. Brown also located two others, one given to F. B. Chewning and the other to S. M. Sheperd, both without the dental degree of title.

"It is strange that on Arthur's diploma, issued on March 9, 1841, Hayden and Harris used the degree of D.D.S. after their names, while on the previous day, March 8, the diplomas signed by Hayden and Brown failed to include the dental degree.

"From recent information obtained from Albany, a petition was made by Parmly to the New York Legislature in February, 1841, for the privilege of incorporating and granting degrees, but this was denied by the committee on Medical Colleges and Societies of the Legislature, for reasons stated under the subject of Colleges, namely the committee refused to grant new charters to newly established so-called degree granting institutions. Though the Society had been so hopeful a few months previous in obtaining this privilege and had illegally used the D.D.S. degree, the practice was immediately discontinued when the petition was denied.

"It seems that the American Society still hoped to obtain its desired charter as late as September 1844 *(Am. J. D. Sc.,* 5: (Art. 1, Sect. 1) p. 68). Meanwhile, Hayden continued to use the Society's D.D.S., until his death in January, 1844, while Harris used it until he received his academic D.D.S., in 1854. This is further confirmed at the fourth Annual Meeting, July, 1843, when a motion was passed 'that Doctors E. Parmly, S. Brown and E. Baker, be continued a Committee to prepare a memorial to be presented to the Legislature of the State of New York, asking for a charter of this Society, and to hold property of the value of $50,000.00, for the purpose of erecting a building in the City of New York, as the depository of its Library, and other property.' *(Am. J. D. Sc.,* 4:69, September 1843.) Nevertheless in the *Journal* for August, 1844, one of the editors says:

" 'We perceive, with regret, that some of the members of the American Society of Dental Surgeons have mistaken the language of the Society's Diploma . . . supposing that it conferred the degree of doctor of dental surgery. Such are informed that the Society has not the power (being yet unchartered) to confer any degree . . . its Diploma being a certificate of membership only.' (4:300.)

"The Virginia Society of Dental Surgeons, organized in December, 1842, closely followed the By-Laws of the American Society, and actually issued diplomas conferring the Doctor of Dental Surgery degree, according to *Stockton's Dental Intelligencer* for Dec. 1, 1845:

" 'To be plain, we notice that the (Virginia) Society issues diplomas, conferring the degree of Doctor of Dental Surgery.'

"This degree was granted by a vote of two-thirds of its members present at a meeting, and the *Intelligencer* adds (pp. 39-40):

" 'If we are not misinformed, the Legislature of New York refused to grant this privilege to the American Society, because that body did not undertake to instruct aspirants for its honors.' "

May I at this time correct an error that appears in the tenth paragraph, which I note the coauthors have likewise made on page 1695: "1854. It is said that he [Chapin A. Harris] received an honorary D.D.S.

from the Philadelphia Dental College." This college was not established until 1862 and consequently could not have conferred the degree upon Harris in 1854.

In November 1852, the Philadelphia College of Dentistry opened as the first dental college in Philadelphia, continuing in operation until March 1856. April 6 of that year, the Pennsylvania College of Dental Surgery was organized, with the first meeting of the new faculty April 23, 1856, and continuing the teaching without interruption by the same faculty in 1855-1856; so that, except for the change in name and incorporators and a new charter, it was a continuation of the previous college. The apparent cause for the change was in the method of granting the honorary degrees of D.D.S. "The Board claimed the right to confer them without consulting the Faculty, while the Faculty contended they should be consulted, as they would be held responsible by the profession for those who received these degrees."

The foregoing is from the Annual Announcement of the Pennsylvania College of Dental Surgery, 1869. In it, there is recorded the name of Chapin A. Harris as receiving it in 1854. Owing to similarity in names, the tenth paragraph should read: "Harris did eventually receive the academic D.D.S. from the Philadelphia College of Dentistry" and not Philadelphia Dental College.

BERNHARD WOLF WEINBERGER, D.D.S.,
119 W. 57th St.,
New York 19, N. Y.

TRENCH MOUTH REMEDY

To the Editor:

A report entitled "Trench Mouth Remedy" and subtitled "Sulfathiazole Tablets Dissolved on Tongue Cause Throat Soreness and Other Symptoms to Disappear in Just Three Days," in *Science News Letter* (44:243, October 16, 1943), summary of current science news published by Science Service, Inc., a non-profit organization with representatives from the leading scientific societies, is most misleading. Although based on a clinical note in the *Journal of the American Medical Association*, which is reviewed fairly accurately, the captions are dangerous.

Maj. C. S. Linton's "Treatment of Vincent's Angina of the Tonsil: A Preliminary Report" (*J.A.M.A.*, 123:341, October 9, 1943) is an account of treatment by the use of 0.5 gm. sulfathiazole tablets dissolved on the tongue every two hours during the day and 1 gm. dissolved on the tongue every four hours at night. In one case, the sulfathiazole tablet was dissolved in a few drops of water and rubbed into the "gum margins," but no details of this case are reported. "Excellent results were secured on the gums in one case using this method, but it was not tried sufficiently to warrant any expression of opinion." Major Linton based his report on treatment of four cases of Vincent's angina of the tonsils. In his first case, a man aged 26 was treated with intravenous mapharsen, aqueous 10 per cent mercurochrome applied to the tonsil, silver nitrate to the tonsil and sodium perborate paste rubbed into the gums. After little improvement in five days, the sulfathiazole was used with sufficient recovery to stop treatment after forty-eight hours. "Some ulceration of the gum margins remained." Case 2 was that of a 13-year-old boy with membranous pharyngitis. Mapharsen was given intravenously and sodium perborate paste was applied to the gum margins. Several days' treatment was followed by gradual recovery, but there was an acute recurrence in both tonsils. Mapharsen intravenously and local treatment were given and, on the fifth day, with infection still present, sulfathiazole was administered. Two days later, the patient had no complaints and there was no soreness of the tonsils, but "there was still some infection in the gum margins." Case 3 was that of a man aged 23 who had had a sore throat for ten days and who showed ulceration of the left tonsil. He was treated by sulfathiazole and did not return, but was looked up after six days. He reported that he felt well after two days and saw no reason for returning. The last reported case was of a youth aged 20 with ulcerations of the right tonsil and gum margin. After three days of sulfathiazole therapy, the throat and gum margins appeared much improved.

In these reports, the oral condition is mentioned as a symptom in three instances. In one of these, the "gum margins appeared much improved" on the third day (Case 4) after treatment with dissolved sulfa-

thiazole tablets, alone. In the other two, the gingival pathosis remained after treatment with sulfathiazole and other drugs (Cases 1 and 2).

Major Linton made a preliminary report in view of an anticipated increase in Vincent's infection among men exposed to strenuous physical conditions with meager rations in war zones. The "very remarkable results suggest that it (sulfathiazole) may be a specific cure for the condition (Vincent's angina of the tonsil), although it is impossible to draw any conclusions." In spite of this statement by Major Linton, *Science News* said, "Sulfathiazole 'may be a specific cure' for trench mouth and the sore throat that often goes with it, Major C. S. Linton, AUS, suggests." That this is not a specific cure for Vincent's stomatitis or gingivitis is evident from the report. In Vincent's angina (angina being any disease characterized by spasmodic suffocation, especially a disease of the pharynx or fauces characterized by such attacks), sulfonamides may be of some specific benefit.

Treatment of Vincent's gingivitis by the local use of mild oxidizing drugs such as hydrogen peroxide or sodium perborate, intelligent home care, careful scaling of the teeth and gingiva, elimination of food traps and overhanging margins, fortification of the diet when necessary and avoidance of escharotics and irritants has proved adequate in our hands. It is hoped that patients will not demand a "specific" remedy, which has not yet been discovered.

HAMILTON B. G. ROBINSON,
D.D.S., M.S.,
Associate Professor of
Oral Histology and Pathology,
WILLIAM F. BARNFIELD, D.D.S.,
Instructor in Bacteriology
and Pathology,
Washington University, St. Louis, Mo.

OBITUARIES

CARL T. GROVE, D.D.S.

(1900-1943)

CARL T. GROVE, born in Owatonna, Minn., October 7, 1900, died at his home, March 27, 1943.

In 1904, he moved to St. Paul with his parents. After graduating from high school, he attended Macalester College and he was later graduated from the University of Minnesota, College of Dentistry in the class of 1927. He was an extern at the University of Minnesota Hospital in 1928.

He practiced in partnership with his father, Carl J. Grove, until the latter's death in July 1942, and, being interested in all phases of dentistry, was closely associated with him in various branches of research.

Although he was engaged in general practice, he gave special attention to root-canal therapy. His recent investigations were in the chemistry of saliva in connection with dental caries, placing emphasis on the value of its ammonia content.

He was also interested in the application of nutrition in dentistry and was associate editor of *Nutrition and Dental Health*.

Dr. Grove was a member of the St. Paul District Dental Society, the Minnesota State Dental Association and the American Dental Association. He is survived by his mother, Mrs. Loula B. Grove.

WILLIAM N. COGAN, D.D.S.

(1856-1943)

WILLIAM N. COGAN, dean emeritus of the Georgetown University Dental School, died Monday, October 4, in Bethesda Naval Hospital, after a long illness.

Dr. Cogan was born in Washington, D. C., May 21, 1856, and was gradu-

ated in dentistry from Columbian College, now George Washington University.

Interested in dental education from the beginning of his dental career, he founded the Washington College of Dentistry. Georgetown University at the time had no dental department, and the new school became a department of Georgetown University. In 1901, the new school of dentistry was opened with Dr. Cogan as dean. On retiring from the Navy in 1923, Dr. Cogan began a second term as dean of the school and, on retirement in 1938, he was made dean emeritus and also was made an honorary doctor of science.

He was instrumental in starting the Naval Dental Corps in 1912. He served the Navy Dental Corps for fifteen years in the World War, holding the rank of lieutenant commander.

One of the most active student organizations at Georgetown is the Cogan Dental Society, organized for the purpose of preparing papers on the profession's problems and for personal discussion. For many years, Dr. Cogan served as president of the Federated Guilds of St. Apollonia, a national dental group for Catholic laymen.

In 1935, he received the annual award and scroll of the Rhode Island State Dental Society for "meritorious service to the dental profession." He was a member of the American Dental Association and the District Dental Society and a Fellow of the American College of Dentists.

Dr. Cogan made his home at 1763 Columbia Road, N.W., Washington, D. C. Mrs. Cogan and a daughter, Mrs. Walter Harrison, of New Orleans, survive.

Funeral services for Dr. Cogan were held in St. Matthew's Cathedral, the Rev. David V. McCauley, regent and dean of the Georgetown University medical and dental schools, celebrating the requiem mass. The remains were interred in Arlington National Cemetery will full naval honors.

GEORGE E. ROLAND, D.D.S.

(1889-1943)

GEORGE E. ROLAND died suddenly November 3, at his home in Oklahoma City, in his fifty-third year.

Dr. Roland was born December 9, 1889, at Bowie, Texas, and removed with his parents to Weatherford, Okla., in 1892, where he grew to manhood. He was educated in the public schools and also attended the Normal College at Weatherford.

In 1907, he entered the Western Dental College at Kansas City, Mo., and from this institution received the degree of D.D.S. in 1911. In the same year, he secured his license to practice and located at Elk City, Okla., where he practiced his profession until he entered the service in 1917. He was honorably discharged in 1919, having attained the rank of captain in the Dental Corps.

Immediately upon his return to private life, he was married to Miss Pearl Jenkins, of Lawton, and they moved to Pawhuska, Okla., where he practiced until 1927. He then moved to Oklahoma City, where he practiced continuously until his death.

Dr. Roland had a record of long and faithful service in community and church life. He was a member of the First Presbyterian Church, Rotary International, Chamber of Commerce, the American Legion and Omicron Kappa Upsilon, an honorary dental fraternity. He was a member of the Oklahoma State Dental Society from the time of his graduation. For his devotion to his profession, he was given positions of honor and trust in the dental society, wherein he served with distinction. He was immediate past-president at the time of his death.

Mrs. Roland and one son, George, a

student in the Oklahoma Military Academy at Claremore, survive.

Few men can lay claim to so many friends as did George Roland. To know him was to love him. It was not for him to question your request, whether professional or personal, but to act. Service was his watchword. Dentistry has lost one of her greatest men and his multitude of friends will mourn his passing.

JOHN D. HERTZ, D.D.S.
(1870-1943)

JOHN D. HERTZ, practicing dentist of Stamford for the past half century, bank director and civic leader, died suddenly at his home in Stamford, Conn., November 26.

Dr. Hertz was born December 27, 1870, at Ephrata, Pa. He was graduated from the Pennsylvania College of Dental Surgery, Philadelphia, and began dental practice in Stamford in 1893. He was a member of the American Dental Association, Connecticut State Dental Association and the Western Fairfield County Dental Association. He is survived by his widow, one son, Clarence E., a sister and three grandchildren.

Dr. Hertz was a member of the staff of the Stamford Hospital, and a director of the Stamford Trust Company and the Stamford Savings Bank.

Long active in the civic affairs of the community, he was a member of the Chamber of Commerce and a founder and first president of the Rotary Club, and served in an advisory capacity on many civic boards. He was an Odd Fellow and a Mason.

Dr. Hertz was a member of the Woodway Country Club and at one time served as president of the Stamford Salvation Army Advisory Board.

DEATHS

AMES, GEORGE FREDERICK, Napa, Calif.; Temple University School of Dentistry; died in August; aged 64.

ARMSTRONG, JAMES H., Belding, Mich.; Detroit College of Medicine, Department of Dental Surgery, 1898; died October 26.

BARREIRO, EMILIO M., Philadelphia, Pa.; Medico-Chirurgical College, Cuba; died November 2; aged 52.

BISGARD, J. J., St. Paul, Minn.; Omaha Dental College, Dental Department of the University of Omaha, 1898; died October 17; aged 78.

BLACKWOOD, A. J., Cincinnati, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1912; died August 19; aged 59.

BROMINSKI, JOHN J., Wilkes-Barre, Pa.; Baltimore College of Dental Surgery, 1920; died October 31.

BUSH, C. A., Brooklyn, N. Y.; New York College of Dentistry, 1886; died October 30.

CALLAR, DONALD, Staunton, Va.; George Washington University, Dental Department, 1914; died October 24; aged 51.

CHRISTIN, CHARLES A., Oak Park, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1897; died August 22; aged 69.

COLBORN, C. ROTH, Philadelphia, Pa.; School of Dentistry, University of Pennsylvania, 1913; died in August; aged 58.

COLLIER, GEORGE W., Houston, Texas; died October 28; aged 82.

DEHAVEN, WILLIAM HENRY, Springfield, Mass.; Kansas City Dental College, 1895; died October 25; aged 83.

DODD, J. R., Tomahawk, Wis.; Chicago College of Dental Surgery, 1896; died August 11; aged 73.

DORAN, EDWARD J., Marysville, Kan.; died July 12; aged 47.

DOWNING, ENOCH, Peebles, Ohio; Ohio Medical University, 1875; died June 2; aged 81.

EDGERLY, SEWARD C., Buffalo, N. Y.; Univer-

sity of Buffalo, School of Dentistry, 1905; died October 20; aged 61.

FARRAND, WILLIAM L., Sturgeon Bay, Wis.; State University of Iowa, College of Dentistry, 1895; died August 8; aged 78.

GIBB, ADALBERT THOMAS, Miles City, Mont.; Louisville College of Dentistry, 1905; died October 9.

GOODWIN, ARCHIE GLENN, Houston, Texas; died August 6.

GOTTSEGEN, NATHAN, New York, N. Y.; New York College of Dentistry, 1915; died November 17; aged 56.

GRANT, ETHEL E., Reading, Mass.; Tufts College Dental School, 1906; died April 12.

GRANT, JAMES, Eureka, Calif.; died August 1; aged 75.

GREEN, E. H., Houston, Texas; died July 31; aged 60.

GROVE, GEORGE N., Owatonna, Minn.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1900; died October 31; aged 66.

GUNNING, THOMAS P., Princeton, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1905; died November 8; aged 61.

HABERLE, FREDERICK E., Chicago, Ill.; State University of Iowa, College of Dentistry, 1919; died November 9; aged 50.

HAVENS, FREDERICK C., Niagara Falls, N. Y.; University of Buffalo, School of Dentistry, 1902; died October 24; aged 62.

HERTHNECK, ROBERT G., Chicago College of Dental Surgery, 1940; died recently. He was a lieutenant (jg) in the regular Army.

HESPE, H. CHARLES, Jersey City, N. J.; Pennsylvania College of Dental Surgery, 1900; died October 23; aged 70.

HOLLISTER, DAVID F., Rathdrum, Idaho; died October 13; aged 73.

HORST, WILLIAM A., Erie, Pa.; University of Pittsburgh, School of Dentistry; died November 5; aged 49.

HOUSE, R. E., Galt, Mo.; Western Dental College, Kansas City, 1912; died October 31; aged 61.

HOWE, EDWARD D., Boston, Mass.; Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, 1885; died November 5; aged 82.

HOWELL, HARRY C., Watertown, N. Y.; University of Buffalo, School of Dentistry, 1898; died October 31; aged 66.

HUGHES, JOHN H., Detroit, Mich.; University of Michigan, College of Dental Surgery 1917; died recently, aged 52.

INGHAM, SYLVESTER LYMAN, Canyon, Texas; State University of Iowa, College of Dentistry, 1894; died October 20.

JOHNSON, R. C., Baltimore, Md.; Dental Department, Medical College of Virginia; died in August; aged 47.

KAUFFMAN, ABBOTT A., Brooklyn, N. Y.; New York College of Dentistry, 1907; died October 17.

KEATING, O. J., Seattle, Wash.; College of Dentistry, University of California; died August 8; aged 56.

LAMOUTTE, LOUIS A., Staten Island, N. Y.; Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, 1886; died in August; aged 77.

LEMMON, GRANT B., Sullivan, Ind.; died July 29; aged 63.

LINDSLEY, ADELBERT C., Mexico, N. Y.; Baltimore College of Dental Surgery, 1886; died August 7; aged 82.

LOCKERY, JOHN W., Scranton, Pa.; Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, 1912; died November 8; aged 52.

LUETSCHER, JOHN U., Galesville, Wis.; Northwestern University Dental School, 1900; died August 7; aged 70.

LYNCH, GEORGE A., Hempstead, N. Y.; died July 29; aged 64.

LYONS, CHARLES W., White Hall, Ill. (formerly of Bloomington, Ill.); Northwestern University Dental School; died October 17; aged 46.

MARLOWE, SEARCY, Tuscaloosa, Ala.; University of Louisville, School of Dentistry, 1896; died November 1; aged 72.

MILLER, ROBERT W., Sioux City, Iowa; died October 27; aged 93.

MILLIRON, L., Wasta, S. D.; died October 25; aged 89.

MOONEY, M. ESTELLE, Cincinnati, Ohio; Cincinnati College of Dental Surgery; died August 11; aged 75.

NUMBERS, E. C., Mount Eaton, Ohio; died October 28; aged 88.

OLDIS, EDWIN L., Waldoboro, Maine (formerly of New York, N. Y.); New York Dental School; died October 9; aged 81.

PAJUNEN, ENSI EMIL, Astoria, Ore.; North Pacific College of Oregon, School of Den-

tistry, 1910; died October 22; aged 65.

PARVEY, HARRY, Providence, R. I.; Temple University School of Dentistry, 1907; died November 5; aged 60.

RANSDELL, FRANK, Sanders, Ky.; died November 1; aged 68.

READ, WILLIAM M., Centerville, Iowa; State University of Iowa, College of Dentistry, 1898; died October 17; aged 71.

RILEY, FRANK R., Pittsburgh, Pa.; University of Pittsburgh, School of Dentistry, 1916; died October 22; aged 48.

RIVERS, BYRON D., Louisville, Ky.; University of Louisville, School of Dentistry, 1901; died October 21; aged 72.

ROBERTS, N. F., Ruston, La.; died October 23.

ROGERS, TIMOTHY, West Palm Beach, Fla. (formerly of Quincy, Ill.); died November 7; aged 82.

SICKMAN, ORRIN F., Galion, Ohio; Western Reserve University, School of Dentistry, 1903; died January 8.

SLACK, HERMAN B., Brooklyn, N. Y.; died in August; aged 49.

SMITH, JAMES NICHOLAS, Toledo, Ohio; Cincinnati College of Dental Surgery, 1908; died June 26; aged 65.

SMYTHE, ELMER A., Indianapolis, Ind.; died August 2; aged 72.

SPINKS, ANDREW MOSLEY, Los Angeles, Calif.; College of Dentistry, University of California, 1905; died November 1; aged 60.

STEVENS, WILLIAM C., Chicago, Ill.; died November 2; aged 36.

SUTER, IRA R., East Liverpool, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1915; died October 29; aged 52.

THORNBURG, EDMUND G., Los Angeles, Calif.; University of Southern California, College of Dentistry, 1916; died August 12; aged 47.

URLING, GEORGE A., JR., Pittsburgh, Pa.; University of Pittsburgh, School of Dentistry, 1899; died October 27.

VOORHEES, JOHN ALBERT, East Orange, N. J.; died October 27; aged 69.

WILDER, EDGAR L., Louisville, Ky.; Baltimore College of Dental Surgery, 1892; died August 14; aged 81.

WILLIAMS, WALTER ALBERT, Los Angeles, Calif.; University of Southern California, College of Dentistry, 1925; died August 23.

WILSON, GARLAND NELA, Alturas, Calif.; College of Physicians and Surgeons of San Francisco, A School of Dentistry, 1923; died May 14.

WILTBERGER, ROLAND B., Columbus, Ohio; Starling-Ohio Medical College, 1907; died May 26; aged 62.

WINKELMAN, WALTER D., Pikesville, Md.; University of Maryland, School of Dentistry, 1902; died recently.

WOLFE, DENNIS M., Gnadenhutten, Ohio; Ohio State University, College of Dentistry, 1928; died February 5; aged 48.

WOOD, HARRY T., St. Louis, Mo.; died October 24; aged 70.

WOOD, LAWSON D., Grand Rapids, Mich.; University of Michigan, College of Dental Surgery, 1881; aged 79.

WOODWARD, WILLIAM C., Middleboro, Mass.; died May 3.

WUICHET, EUGENE F., Cleveland, Ohio; Ohio College of Dental Surgery, 1891; died August 28.

YOUNG, DOUGLAS HAMILTON, Attica, N. Y.; University of Buffalo, School of Dentistry, 1896; died September 11.

ZACHARY, JOHN W., Hertford, N. C.; Southern Dental College; died October 7; aged 40.

ZAMETKIN, JOEL M., Brooklyn, N. Y.; New York College of Dentistry, 1909; died November 14; aged 59.

ZERAN, LEWIS HERBERT, Rockford, Iowa; died April 9; aged 74.

ZIENNSKI, STANLEY T., Pelly, Texas; Texas Dental College, died June 3; aged 40.

CURRENT LITERATURE

Surgical Treatment of Tumors of the Salivary Glands

ROBERT M. JANES

SINCE parotid tumors are highly radioresistant, total parotidectomy is the treatment of choice. With anatomical drawings of the surgical dissections, the relatively easy technic for total removal of parotid gland tumors is described. Occasionally complete excision of the parotid is possible without injury to the facial nerve. This depends on the extent and malignancy of the tumor. Radiation should be used only as palliative treatment for hopelessly inoperable cases and as postoperative treatment of highly malignant lesions.—*Surg. Clinics of N. A.*, 23:1429, October 1943.

PAUL H. KEYES.

The Control of Sepsis

J. M. ROBSON

OUR conception of the value of chemical substances for treating infections has been altered by the rapid development of chemotherapy. The stage at which treatment is initiated determines what can be achieved by use of chemical substances. Immediate disinfection by certain substances (e.g., some detergents, acridine derivatives) can frequently be achieved if treatment is started very soon after infection. For delayed treatment and to prevent reinfection of open wounds, bacteriostatics (e.g. sulfonamides, penicillin) are required. When sepsis is established, chlorine solutions are effective. Penicillin and the sulfonamides can be used topically, but only penicillin will exert its activity in the presence of pus.—*Edinburgh Med. Jour.*, 50:399, July 1943.

PAUL H. KEYES.

Dental Caries in Children in Madras City in Relation to Economic and Nutritional Status

K. L. SHOURIE

STATISTICAL studies were made of 1,886 children in varying economic classes and nutritional states in an effort to ascertain (1) the incidence of caries in a fairly large group of rice-eating children, (2) whether economic status influences the incidence of caries, and (3) whether children in poor states of nutrition, as shown by manifest deficiency disease, are more prone to caries than those receiving normal diets. The percentage of children showing no caries was 39.8. Economic status seemed to have no influence over caries incidence. Differences were seen between various groups at different age-levels, but it was impossible to establish any statistical significance for the inconsistencies shown in the data. It was confirmed that urban children in all age-groups show more caries than rural children, and that wheat (whole) eaters have a slight advantage over rice eaters.

Children actually suffering from deficiency disease (Bitot's spots, phrynoderma, and angular stomatitis) and therefore well below average nutritionally, showed no tendency to suffer more from caries than normally nourished children. Observations in India suggest that American style propaganda, teaching that diets containing abundant milk, vegetables, eggs, butter and fruit will insure development of good teeth and prevent decay, while it is of doubtless value in dietary education, is not likely to prove a satisfactory weapon against attack by dental caries in that country.—*Indian J. Med. Res.*, 30:561, October 1942.

DAVID B. SCOTT.

A New Sulfa Compound, Desoxyephedronium Sulfathiazole, for the Treatment of Sinusitis

F. M. TURNBULL ET AL.

A NEW group of sulfa compounds was discovered as a result of work on stabilization of aqueous solutions of salts of the sulfa drugs, and incorporation of vasoconstrictors. A stabilized solution of sodium sulfathiazole with di-desoxyephedrine hydrochloride shows the following therapeutic characteristics: 1. It is apparently an effective bacterial agent for treatment of infections of the

upper respiratory tract; 2. Its toxicity is relatively low; 3. It has prompt and prolonged vasoconstrictor action without side-effects; 4. It has comparatively favorable influence on ciliary motility; 5. Histopathological results show that it is non-injurious to mucous membrane.—*Laryngoscope,* 53: 533, August 1943.

DAVID B. SCOTT.

Gradual Adaptation in Increasing Vertical Dimension

PERLEY J. LESSARD

IN cases of bite revision, a temporary corrective appliance, worn before the construction of a permanent restoration, allows the patient gradually to accommodate himself to the increased vertical dimension. The technic of bite revision by the construction of both the temporary corrective appliance and the permanent removable appliance is presented and well illustrated.—*Dental Digest,* 49:437, October 1943.

PAUL H. KEYES.

Osteoradionecrosis and Cancer of the Head and Neck

MAJOR MARSHALL B. STEWART

DENTISTS are usually the first to recognize and report osteoradionecrosis of the jaws. It may be produced by: roentgen rays, radium, arsenic, phosphorus, and thorium. The head bones most frequently attacked by radiation are: (1) mandible, (2) maxilla and (3) bones of the calvarium. The mandible, because of its ribbonlike shape, compactness, and poor blood supply, is the most susceptible. The early symptoms are: (1) hypersensitivity of teeth to sweets, cold, and heat; (2) a sensation of elongation of the teeth due to pericemental inflammation; (3) decreased salivation; (4) continuous dull pain similar to toothache. In the late stages the roentgenogram shows bone destruction. Clinically, there may be swelling and ulceration of the soft tissues, trismus, draining sinuses, a fistula draining saliva, exposed bone, spontaneous fracture, and sequestration. Treatment is primarily prophylactic: all teeth, good or bad, on the side of the jaw to be irradiated should be extracted. Normal tissue should be protected by lead shields. When radium is used interstitially, special lead shields reinforced with modeling compound should be worn at all times except when eating. Strong mouth washes should not be used. Pulps devitalized by irradiation should be extirpated and the root canals filled. No teeth should be extracted for several years following irradiation of the jaws.—*Arch. Otolaryng.,* 38:403, October 1943.

PAUL H. KEYES.

Control of Postoperative Pain

EARL G. KRIEG

THE application of ice caps to the operative area to aid in the control of postoperative pain and the substitution of this method for the administration of narcotics is of general surgical interest. This is especially true when operations are performed upon the aged, the allergic and the badly injured in civil and military practice. The temperatures induced by the application of bare ice caps is approximately 6° C. The efficacy of the ice caps is attested to by the reduction in the amount and type of narcotic required postoperatively, 1 grain of codeine sulfate being generally sufficient to control the residual pain. There also is a coincident fall in number of complications attributable to anesthesia and/or operation.—*Am. J. Surg.,* 42:115, October 1943.

S. J. FANALE.

Protection of Radium Dial Workers and Radiologists from Injury by Radium

ROBLEY D. EVANS

THERE are three distinct industrial hazards in the handling of radium and its products: (1) radium poisoning, from ingestion or inhalation of radium, (2) respiratory lesions from inhaled radon gas and (3) radiation injury from whole body exposure to gamma rays.

Biochemically it is a non-toxic substance, as it is metabolized in much the same way as calcium, a small fraction of the amount ingested being deposited in the skeleton and the remainder being excreted. However, the alpha rays from radium and from its decay products, which do enter the bones, bombard the blood producing centers, bone cells, osteoclasts and osteoblasts, and the bone structure. If the amount is large (10-100 micrograms), clinical symptoms of acute radium poisoning with leukopenia, lymphocytosis osteomyelitis, and tissue lesions may appear in a year or two. More common today is chronic radium poisoning (1-10 micrograms

fixed in the skeleton). Clinical symptoms usually appear 5-15 years after exposure. There is often no deviation from normal blood count, and tissue abnormalities are rare. Bone rarefaction, necrosis, and osteogenic sarcoma are the usual terminal results. The mandible and maxilla are frequently involved, but this is not associated with the mode of entrance of radium into the body. The fact that jaw bones are mainly trabecular may account for the high initial concentration of radium in this area.—*Jour. of Industrial Hygiene and Toxicology,* 25:253, September 1943.

PAUL H. KEYES.

Carcinoma of the Tip of the Tongue

IRA FINK and JOHN GARB

AN unusual case of carcinoma of the tip of the tongue is reported, in which the carcinoma was metastatic from a primary malignant tumor of the breast. More than two years after a radical breast operation for cancer followed by a course of deep x-ray treatments, the patient noticed a growth at the tip of the tongue which enlarged and became "ulcerated," and which was diagnosed as a squamous cell epithelioma. A search of the literature did not reveal a similar occurrence.—*Mil. Surgeon,* 93:368, October 1943.

S. J. FANALE.

Fissural Cysts of the Median Palatine Suture

M. MICHAEL COHEN

IN the embryologic union of the palatal elements, epithelial remnants may persist anywhere along the median palatine suture and in later life if stimulated may give rise to cysts. They are usually formed in the suture line posterior to the incisive canal. Nasopalatine and epithelial remnants in the incisive canal can also cause cysts, which can usually be differentiated from median cysts by roentgen examination. The median cysts show a connective tissue sac varying in thickness according to size. If the cyst is large, the membrane is thin and made up of loosely connected collagen fibers. The incisive canal cysts generally contain a thick connective tissue membrane in which are found groups of mucous glands, or tiny accessory mucoid containing cysts. On diagnosis the treatment is surgical removal of all the cyst contents. The teeth should not be removed even though their apices seem to protrude into the cyst cavity.—*Am. J. Orthodontics,* 29:442, August 1943.

S. J. FANALE.

Fractures of the Zygoma

W. A. COAKLEY and M. F. WHITE

SEVENTY-TWO fractures of the zygoma were treated by the authors with excellent results in 85 per cent of the cases. The successful operations were performed within 2 to 6 days after injury. The remaining 15 per cent were treated late, but showed considerable improvement. The most successful methods of operative approach in reducing these fractures have been proved to be the temporal and intra-oral. It was found that packing the antrum and allowing the pack to remain from 8 to 14 days caused no apparent harm. Reduction should be attempted no later than the 6th to 10th day if possible, since early operative reduction is relatively simple. Early diagnosis contributes greatly to successful reduction.—*Surg., Gynec. and Obst.,* 77:360, October 1943.

S. J. FANALE.

Erosion of the Ala Nasi Following Trigeminal Denervation

J. SCHORSTEIN

A NEW clinical syndrome which followed trigeminal denervation in eight cases is described. The most striking feature in seven of the cases was erosion of the anesthetic nasal wing. Allied with this were paresthesia, self-inflicted trauma, epistaxis, nasal fissures, and facial ulcers. The trauma is usually inflicted in response to paresthesia. It is suggested that failure of the cutaneous vasodilator reflex determines the progress of the lesion.—*J. Neurol. and Psychiat.,* 6:47, January-April 1943.

DAVID B. SCOTT.

Physical Medicine in Maxillofacial Injuries

H. H. WEISENGREEN

IMOPRTANCE should be attached to returning the maxillofacial patient to his physical status prior to the injury as expediently as possible and without functional disability. Physical therapy, although much neglected, has much to offer both surgeon and patient in the matter of a speedy and non-disabling

recovery, since, without the use of physiotherapeutic agents, healing is slower, and voluntary muscle control is regained with great difficulty if immobilizing appliances have been used. By physical medicine is implied, literally, nature's own forces of healing. Those physical agents found useful in the facial region are (1) thermotherapy, with two divisions, light therapy and electrotherapy, and (2) mechanotherapy. Best results are obtained using both in combination, and their use should begin after the acute stages of hemorrhage have resided and should be continued until recovery is fully established. Treatments are mild and gentle at first, gradually increasing in length and intensity according to the surgeon's judgment. The physical agents to be used are described.—*Mil. Surg.*, 93:294, August 1943.

S. J. FANALE.

Incidence of Urease-Producing Bacteria in Saliva

By M. K. HINE and J. F. O'DONNELL

BACTERIA capable of producing urease were found in 92.8 per cent of 405 salivary samples from eighty-two patients. This study was made by inoculating a medium which was very selective for urease-producing bacteria with 0.2 cc. of unstimulated saliva. In general, salivary samples which gave low *L. acidophilus* colony counts and limited acid production from glucose contains more active urease-producing bacteria than did salivary samples which gave extremely high *L. acidophilus* counts and produced much acid. Use of carbamide in a mouth rinse should result in its conversion into a buffer, ammonium carbonate, in most cases, because of the presence of urease-producing bacteria in the oral flora. Attempts were made to correlate the incidence of urease-producing bacteria and dental-caries activity, but the findings do not warrant a definite conclusion.—*J. D. Res.*, 22: 103, April 1943.

Ameloblastoma—Review of Thirty-Four Cases

By JOSEPH L. BERNIER

PREVIOUS statistical reports have indicated certain questionable features of the ameloblastoma. Some of these have been again indicated in this survey while others have appeared to be no more than incidental findings. It seems that the ameloblastoma, even though it has as its source the stratum germinativum of the oral epithelium, bears little or no relation to the basal-cell carcinoma. Certainly, its microscopic and clinical features are entirely distinct.

The presence of secondary infection in this series of cases indicates that this has not been seriously considered in the review of previous cases. It is possible that the presence of a severe purulent infectious process may influence the activity of the epithelial component of the tumor, resulting in a form of pseudo-epitheliomatous hyperplasia.

This is essentially a tumor of middle age occurring most often at the angle of the ramus of the mandible; which accounts for the difficulty of removal and hence the large percentage of recurrences, together with the high incidence of secondary infection. All of the cases reviewed are from the files of the Army Medical Museum and the Registry of Dental and Oral Pathology of the American Dental Association, of which the author is secretary and pathologist.—*J. D. Res.*, 21:529, December 1942.

Innervation of Dentin

By JULIAN AMBROSE

Too much reliance has been placed upon the use of "specific" stains in the search for dentinal nerves. In taking this hurdle, the author used the teeth of adult and fetal human beings and the teeth of kittens, the last obtained by unilateral section of the nerves to the mandible, permitting the nerves in front of the site of operation to degenerate, and then comparing the dentin of the teeth from opposite halves of the mandible. All the tissues were decalcified and embedded in paraffin in routine fashion, and similarly stained with silver, gold, hematoxylin and eosin, van Gieson and Mallory.

Regardless of which stain was used, the structures described by certain workers as nerves were found in all sections, appearing like fine undulating fibers accompanying the dentinal fibers within the dentinal tubules. No difference was observed in the teeth of the kittens, whether from the control side or the side of operation. The tooth germs of the fetuses, in which neurotization does

not take place until after birth, possessed both dentinal and accessory fibers. These fibers, therefore cannot be nerves.

Study of the developing tooth germ and the structure of the odontoblast led the author to the concept that these fibers, hitherto considered to be nerves, are degenerated dentinal fibers. He concludes that (1) there are no nerves in dentin; (2) the structures previously believed to be dentinal nerves are degenerated dentinal fibers, and (3) the dentinal fiber is the logical agent for the transmission of nervous impulses through the dentin.—*J. D. Res.*, 22:13, February 1943.

Development and Physiologic Purpose of the Organic Matter of Enamel

By BERNHARD GOTTLIEB

IT is shown that the prism sheaths and the tufts are developed after the first formation of the enamel matrix. Threads remain in the early matrix stage of poor calcification, while the parts between calcify more to prisms. The less calcified threads: prism sheaths and tufts, fix the prisms to each other and the enamel to the dentin. Where the prisms do not run parallel, they have to be looked upon as a crystallization product from the homogeneous matrix. The development of the enamel shows four stages: preenamel formation, homogeneous matrix formation, prism differentiation and enamel maturation.—*J. D. Res.*, 22:185, June 1943.

Average Weights of the Permanent Teeth, Including the Relative Amounts of Enamel to Dentin and Cementum

By VIRGIL D. CHEYNE and JOHN T. OBA

FROM approximately 500,000 teeth extracted by Indiana dentists, 759 sound specimens, representing the thirty-two permanent types, were selected. Only those were used which conformed to normal anatomic forms and exhibited a minimum amount of wear. In all cases, the roots were completely formed. Those with excessive amounts of secondary cementum were not used. The teeth were carefully cleaned and placed in a humidifier until the moisture content attained an equilibrium. Enamel was separated from dentin and cementum by the Manly-Hodge flotation method. The average weight of each tooth type and the percentage of enamel (expressed in parenthesis) was as follows: maxillary teeth: first incisor, 1.1917 (22.02 per cent); second incisor, 0.8171 (21.30 per cent); canine, 1.2821 (22.01 per cent); first premolar, 1.2283 (22.67 per cent); second premolar, 1.1266 (19.43 per cent); first molar, 2.4830 (23.79 per cent); second molar, 2.1780 (20.48 per cent); third molar, 1.7323 (23.30 per cent); mandibular teeth: first incisor, 0.5494 (12.67 per cent); second incisor, 0.6326 (18.83 per cent); canine, 1.0945 (12.44 per cent); first premolar, 0.9712 (16.96 per cent); second premolar, 1.0934 (29.58 per cent); first molar, 2.3175 (21.87 per cent); second molar, 2.2656 (26.10 per cent); third molar, 1.9891 (26.15 per cent). Summary figures disclose 22.9524 gm. of tooth substance in the average adult dentition. The average ratio of enamel to dentin and cementum is 3.51.—*J. D. Res.*, 22:181, June 1943.

Clinical Observations on Amalgams with Known Physical Properties

By R. W. PHILLIPS, ET AL.

THE operators perfected themselves in a technic which produced an expansion of twenty-five microns when alloy was underamalgamated and nine microns on using the manufacturer's directions, and contraction of four microns in the three-minute mix. One hundred and thirty fillings, using all three mixes, placed in the mouth and examined after a six-months period, showed apparent expansion of fillings that were underamalgamated and contraction on the three-minute mix. Underamalgamated fillings were inferior in terms of tarnish and roughness. Amalgams were tested for delayed expansion caused by contamination. Only two fillings were contaminated and both showed excessive expansion.—*J. D. Res.*, 22:167, June 1943.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ACADEMY OF RESTORATIVE DENTISTRY, Chicago, Ill., February 19-20.

AMERICAN ASSOCIATION OF ORTHODONTISTS, Chicago, Ill., April 25-27.

AMERICAN BOARD OF ORTHODONTISTS, Chicago, April 23-24.

CHICAGO DENTAL SOCIETY, February 21-23.

CLEVELAND DENTAL SOCIETY, May 8-10.

DALLAS (TEXAS) MID-WINTER DENTAL CLINIC, January 24-26.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second and fourth Tuesdays in each month, from October to June, at the United States Public Health Service Auditorium, Washington.

THOMAS P. HINMAN MID-WINTER CLINIC, Atlanta, Ga., March 26-28.

NATIONAL BOARD OF DENTAL EXAMINERS, January 24-25, May 1-2.

NEW YORK SOCIETY OF ORTHODONTISTS, New York, March 6-7.

GREATER PHILADELPHIA ANNUAL MEETING, February 2-4.

ROOT CANAL THERAPY ORGANIZATION, Chicago, February.

SOUTHWESTERN SOCIETY OF ORTHODONTISTS, Shreveport, La., February 28-March 2.

STATE SOCIETIES

January

Rhode Island, at Providence

March

Minnesota, at St. Paul (1-3)

Wisconsin, at Milwaukee (20-22)

April

Louisiana, at Shreveport (13-15)

Michigan, at Detroit (17-19)

Missouri, at Jefferson City (24-26)

Virginia, at Richmond (3-5)

May

Georgia, at Atlanta (7-10)

Illinois, at Springfield (8-11)

Montana, at Billings (4-6)

New York, at Buffalo (9-12)

North Carolina, at Raleigh (1-3)

STATE BOARDS OF DENTAL EXAMINERS

Indiana, at Indianapolis, April 24-27. Carl A. Frech, Gary National Bank Bldg., Gary, Secretary.

Maine, at Augusta, January 6-8. Carl W. Maxfield, 21 Central St., Bangor, Secretary.

New Jersey, January 10-15. J. F. Burke, 150 E. State St., Trenton, Secretary.

Ohio, at Columbus, practical examination, February 28-March 1 (dental), February 29 (dental hygiene); theory, March 2-4. Earl D. Lowry, 79 E. State St., Columbus 15, Secretary.

Virginia, at Richmond, January 4. John M. Hughes, 715 Medical Arts Bldg., Richmond, Secretary.

THE AMERICAN ACADEMY OF RESTORATIVE DENTISTRY

THE American Academy of Restorative Dentistry will hold its annual meeting at the Palmer House, Chicago, Ill., February 19 and 20.

W. SAMUEL TUCKER,
Secretary-Treasurer,
940 Canal Building,
New Orleans 12, La.

AMERICAN ASSOCIATION OF ORTHODONTISTS

THE next meeting of the American Association of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, Ill., April 25, 26, 27. Members of the American Dental Association are invited to attend this meeting upon the presentation of proper credentials and payment of the registration fee. Credentials should be obtained in advance from the secretary of the American Association of Orthodontists or a secretary of a constituent orthodontic society.

MAX E. ERNST, *Secretary,*
1250 Lowry Medical Arts Building.,
St. Paul 2, Minn.

AMERICAN ASSOCIATION OF ORTHODONTISTS RESEARCH SECTION

AT the present time, there is no opportunity afforded men interested in orthodontic research to meet to discuss their problems. At the last meeting of the American Association of Orthodontists, it was proposed that the Research Committee be empowered to arrange a portion of the program for the next annual meeting, to be held in Chicago, April 25-27.

The program will consume one-half day and will be restricted to ten or fifteen minute reports by men actively engaged in research in orthodontia or its allied fields. Time will be allowed for discussion of all presentations, in order that the greatest benefit may accrue to those participating. All institutions and all individuals are invited to request time.

For further information or time reservations on the program, address

ALLAN G. BRODIE, *Chairman,*
Research Committee, A. A. O.,
30 North Michigan Ave.,
Chicago, Ill.

AMERICAN BOARD OF ORTHODONTICS

THE 1944 meeting of the American Board of Orthodontics will be held at the Edgewater Beach Hotel, Chicago, Ill., April 23 and 24. Orthodontists who may desire to be certificated by the Board can obtain application blanks from the secretary, Bernard G. deVries, 705 Medical Arts Bldg., Minneapolis, Minn.

CHICAGO DENTAL SOCIETY ANNUAL MIDWINTER MEETING

THE Eightieth Annual Midwinter Meeting of the Chicago Dental Society will be held February 21-23, at the Palmer House.

HARRY A. HARTLEY, *Secretary,*
30 N. Michigan Ave.,
Chicago 2, Ill.

CLEVELAND DENTAL SOCIETY ANNUAL SPRING CLINIC MEETING

THE Annual Spring Clinic Meeting of the Cleveland Dental Society will be held at the Hotel Carter, May 8-10.

H. C. ALEXANDER,
Windermere Theatre Bldg.,
East Cleveland, Ohio.

DALLAS MID-WINTER DENTAL CLINIC

THE seventeenth annual meeting of the Dallas Mid-Winter Dental Clinic will be held January 24-26, 1944. For further information, address

J. R. TIPTON, *Secretary,*
Medical Arts Bldg.,
Dallas, Texas.

THE THOMAS P. HINMAN MID-WINTER CLINIC

THE Thomas P. Hinman Mid-Winter Clinic will be held at the Municipal Auditorium, Atlanta, Georgia, March 26, 27, 28.

S. A. GARRETT, *Chairman,*
302 Medical Arts Building.,
Atlanta, Ga.

NATIONAL BOARD OF DENTAL EXAMINERS

THE following are the dates for the next examinations of the National Board of Dental Examiners: January 24-25; May 1-2. Applications should be sent through deans.

GORDON L. TEALL, *Secretary.*

NEW YORK SOCIETY OF ORTHODONTISTS

THE annual or spring meeting of the New York Society of Orthodontists will be held at the Waldorf-Astoria Hotel, New York, March 6-7.

NORMAN L. HILLYER, *Secretary,*
Professional Bldg.,
Hempstead.

GREATER PHILADELPHIA ANNUAL MEETING

THE Greater Philadelphia Annual Meeting will be held February 2-4, 1944 at the Benjamin Franklin Hotel.

JOHN P. LOOBY, *Chairman,*
Publicity Committee.

ROOT CANAL THERAPY ORGANIZATION

AT the Midwinter Meeting of the Chicago Dental Society, a national group for the study of root canal therapy was organized. W. Clyde Davis was made president, and John H. Hospers, secretary-treasurer. Committees were appointed to draw up a constitution and to select a name, to be submitted at the next regular meeting, in Chicago in February. It is hoped that all

those who are interested in this fundamental phase of dentistry will associate themselves with the group. Those joining before the final organization will be considered charter members. Annual dues were temporarily set at $2. All correspondence should be addressed to

JOHN H. HOSPERS, *Secretary,*
25 E. Washington St.,
Chicago, Ill.

SOUTHWESTERN SOCIETY OF ORTHODONTISTS

THE Twenty-Fourth Annual Meeting of the Southwestern Society of Orthodontists will be held in Shreveport, La., February 28-March 2, at the Washington-Youree Hotel.

JAMES O. BAILEY, *Secretary,*
Hamilton Bldg.,
Wichita Falls, Texas.

GEORGIA DENTAL ASSOCIATION

THE seventy-sixth annual meeting of the Georgia Dental Association will be held in Atlanta, May 7-10, with headquarters at the Ansley Hotel.

R. H. MURPHY, *Secretary,*
605 Bankers Insurance Bldg.,
Macon.

ILLINOIS STATE DENTAL SOCIETY

THE next meeting of the Illinois State Dental Society will be held in Springfield, May 8-11.

L. H. JACOB, *Secretary,*
Jefferson Bldg.,
Peoria 2.

LOUISIANA STATE DENTAL SOCIETY

THE next meeting of the Louisiana State Dental Society will be held April 13-15, at the Washington-Youree Hotel, Shreveport.

MICHIGAN STATE DENTAL SOCIETY

THE Eighty-Eighth Annual Meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, April 17-19.

S. G. APPLEGATE,
General Chairman,
630 E. Jefferson Ave.,
Detroit.

MINNESOTA STATE DENTAL ASSOCIATION

THE sixty-first annual session of the Minnesota State Dental Association will be held in the Municipal Auditorium, St. Paul, March 1-3. All members of the American Dental Association are invited to attend.

L. M. CRUTTENDEN, *Secretary,*
498 Lowry Bldg.,
St. Paul.

MISSOURI STATE DENTAL ASSOCIATION

THE next meeting of the Missouri State Dental Association will be held at Jefferson City, April 24-26, at the Governor Hotel.

C. W. DIGGES, *Secretary,*
Exchange National Bank Bldg.,
Columbia.

MONTANA STATE DENTAL ASSOCIATION

THE 1944 meeting of the Montana State Dental Association will be held in Billings, May 4-6.

T. T. RIDER, *Secretary,*
9 Higgins Block,
Missoula.

DENTAL SOCIETY OF THE STATE OF NEW YORK

THE Seventy-Sixth Annual Meeting of the Dental Society of the State of New York will be held in Buffalo, at the Hotel Statler, May 9-12.

PERCY T. PHILLIPS,
Press and Publication Committee,
18 E. 48th St.,
New York 17.

NORTH CAROLINA DENTAL SOCIETY

THE Seventieth Annual Meeting of the North Carolina Dental Society will be held at the Hotel Sir Walter, Raleigh, May 1-3.

E. M. MEDLIN, *Secretary,*
Aberdeen.

RHODE ISLAND STATE DENTAL SOCIETY

THE next meeting of the Rhode Island State Dental Society will be held in Providence in January.

CHARLES F. MCKIVERGAN,
Secretary Pro Tem.,
102 Waterman St.,
Providence.

VIRGINIA STATE DENTAL ASSOCIATION

THE Virginia State Dental Association will hold its next annual meeting April 3-5, at the John Marshall Hotel, Richmond.

J. E. JOHN, *Secretary*,
Medical Arts Bldg.,
Roanoke.

WISCONSIN STATE DENTAL SOCIETY

THE Wisconsin State Dental Society will hold its seventy-fourth annual convention at the Hotel Schroeder, Milwaukee, March 20-22. A meeting of the executive council and house of delegates will precede the general convention March 19.

KENNETH F. CRANE, *Secretary*,
1233 Bankers Bldg.,
Milwaukee.

INDIANA STATE BOARD OF DENTAL EXAMINERS

THE Indiana State Board of Dental Examiners will hold its next examination in Indianapolis, April 24-27. All credentials and fees must be filed with the secretary at least two weeks prior to the examination.

CARL A. FRECH, *Secretary*,
Gary Nat'l Bank Bldg.,
Gary.

MAINE STATE BOARD OF DENTAL EXAMINERS

THE next examination of the Maine State Board of Dental Examiners will be held in the State House, Augusta, January 6-8. All credentials must be in the hands of the secretary at least ten days prior to the date of the examination. For application blanks and information, address,

CARL W. MAXFIELD, *Secretary*,
31 Central St.,
Bangor.

STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY OF NEW JERSEY

THE State Board of Registration and Examination in Dentistry of New Jersey will hold its next examinations January 10-15. A copy of the requirements and rules, instruction sheet and preliminary application blank will be sent on request. Preliminary application blanks, together with the examination fee of $25, should be sent to the secretary on or before November 15.

J. F. BURKE, *Acting Secretary*,
150 E. State St.,
Trenton.

OHIO STATE DENTAL BOARD

THE next practical examination of the Ohio State Dental Board will be held at Ohio State University College of Dentistry, Columbus, February 28-March 1. The practical examination for dental hygienists will be given February 29. The theory examination for both dental and dental hygiene applicants will be held in Columbus, March 2-4. Applications for these examinations must be in the hands of the secretary not later than February 18 and no application will be accepted after that date. For further information, apply to

EARL D. LOWRY, *Secretary*,
79 E. State St.,
Columbus 15.

VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Virginia State Board of Dental Examiners will be held at the Medical College of Virginia, Richmond, beginning at 9 a.m., January 4. No applications will be accepted after December 20. Incomplete applications will be rejected and returned. For application blanks and further information, address

JOHN M. HUGHES, *Secretary*,
715 Medical Arts Bldg.,
Richmond.

PAN AMERICAN ODONTOLOGICAL ASSOCIATION SCHOLARSHIP

THE Pan American Odontological Association takes pleasure in announcing an annual scholarship at the Tufts College Dental School, Boston, Mass., for graduate dentists from any of the Latin American countries. The subjects of study include: complete denture prosthesis, partial denture prosthesis, minor oral surgery, operative dentistry, ceramics, children's dentistry, root surgery and radiology, preventive dentistry and treatment of parodontal diseases.

This annual scholarship is an addition to the already available Pan American Odontological Association scholarships at the New York University, College of Dentistry; Evans

Dental Institute, School of Dentistry, University of Pennsylvania, and the W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, University of Michigan.

RALPH HOWARD BRODSKY, D.M.D.,
Executive Secretary,
14 East 81st St.,
New York 28, N. Y.

VOLUNTEERSHIPS AND EXTERNSHIPS, BRONX HOSPITAL

THERE are several volunteerships and externships available for recent graduates at the dental clinic, Bronx Hospital, in the following departments: oral surgery and exodontia, operative dentistry, orthodontia, surgical periodontia and root canal therapy. Applicants address David Wurzel, director of the Dental Department, Bronx Hospital, 169th St. & Fulton Ave., Bronx, New York.

DENTAL INTERNSHIPS

Two internships are available at the St. Louis City Hospital for recent dental graduates. Opportunity is afforded for training and experience in dental and oral surgery, diagnosis and other phases of dentistry. Applicants should address Leo J. Wade, Medical Director, or Hamilton B. G. Robinson, D.D.S., City Hospital, 1515 Lafayette Ave., St. Louis, Mo.

DENTAL INTERNSHIPS

THE Greater New York Conference of Hospital Dental Services, comprised of a group of men who are chiefs of dental services, would like to aid those men seeking dental internships in hospitals in the metropolitan area. Those who are not in the Army or the Navy and who are desirous of obtaining internships should communicate with

MARY E. REILLY, *Secretary,*
386 Fourth Ave.,
New York, N. Y.

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS OF THE NAVY

THE next examination for appointment as Assistant Dental Surgeon, U. S. Navy (lieutenant [junior grade], Dental Corps, U. S. Navy) will be held at the Naval Training Station, Norfolk, Va., the Naval Training Station, Great Lakes, Ill., the Naval Training Station, San Diego, Calif. and the Naval Dental School, National Naval Medical Center, Bethesda, Md., January 24. Application for this examination should be made to the chief of the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. Applicants for appointment as Assistant Dental Surgeons must be citizens of the United States, more than 21, but less than 32 years of age at the time of acceptance of appointment, and graduates of a Class A dental school. A circular of information listing physical and other requirements for appointment, subjects in which applicants are examined and other data pertaining to salary, allowances, etc., can be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., on request.

UNIVERSITY OF CALIFORNIA RESEARCH ASSISTANT

THE College of Dentistry University of California has an appointment as research assistant available for a qualified person beginning June 30. The appointment is in the Division of Dental Medicine and is for one year. This may be extended for an additional year.

This appointment is designed primarily for dental graduates with an interest in dental research and teaching. However, this dental degree requirement can be waived if other qualifications justify it.

The basic salary is $1,500 a year, plus an emergency increase to care for added living costs.

Application forms may be obtained from the Dean of the College of Dentistry, University of California, San Francisco, Calif.

WILLARD C. FLEMING, *Dean.*

PRIZE ESSAY CONTEST

THE Research Committee of the American Association of Orthodontists has been empowered by the board of directors to conduct a prize essay contest. The prize has been set at $200, and will be offered annually until further notice. The terms of the competition are as follows:

ELIGIBILITY

Any student enrolled in a recognized uni-

versity, or any person who has completed his or her formal education in orthodontia not more than three years prior to January 1, is eligible to compete for the prize.

ESSAY

The essay must represent a piece of original research having a direct bearing on the field of orthodontia. It may relate either to a biologic or a clinical problem and may represent material that has been offered in partial fulfilment of the requirements for a graduate or postgraduate degree, or any graduate, postgraduate or undergraduate contest. Papers previously submitted and now published or in press will be accepted for the present contest. All essays must be in the hands of the committee by February 1. If no essay is deemed worthy by the committee, the prize will be withheld.

AWARD

The prize-winning essay will be accorded a place on the scientific program of the annual meeting of the association, at which time the prize will be awarded. The association will retain publication rights on the first three choices.

For further information, address

ALLAN G. BRODIE, *Chairman,*
Research Committee, A. A. O.,
30 North Michigan Ave.,
Chicago, Ill.

UNIVERSITY OF ILLINOIS RESEARCH FELLOWSHIPS

APPLICATIONS for Research Fellowships in Medicine, Dentistry and Pharmacy in the University of Illinois are now being considered for the year beginning September 1, 1944. Appointments to these Fellowships will be announced January 1.

Candidates for these Fellowships must have completed a training of not less than eight years beyond high school graduation. The Fellowship carries a stipend of $1,200 per calendar year with one month's vacation.

Application blanks and further information can be secured from the secretary of the Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 West Polk St., Chicago 12, Ill.

UNITED STATES PATENTS APPLICABLE OR PERTAINING TO DENTISTRY ISSUED DURING SEPTEMBER AND OCTOBER 1943

September 7

2,328,575, SIMON MYERSON. Artificial tooth.

2,328,924, LOUIS JOHN RUF. Equipment stand.

2,329,154, ARTHUR H. BULBULIAN. Oxygen supplying inhalation mask.

September 21

D-136,376, VICTOR H. CARPENTER. Design for a dental tool unit.

September 28

2,330,476, LUCILLE E. DONCHESS. Surgical chair.

2,330,485, HERMAN L. FRANK. Device for use in examining teeth.

October 5

2,331,225, FRANK T. POWERS. X-ray apparatus.

October 12

2,331,463, RICHARD P. ELLIOTT. Saliva siphon.

2,331,526, FREDERICK CHARLES WAPPLER. Illuminating device for surgical instruments.

2,331,539, CLIFFORD E. DANIELSON. Breath deflector.

D-135,463, REED W. ROBINSON. Design for a toothbrush.